INSTALLATION AND OPERATION MANUAL

Vantage (VTG)

Condensing Hydronic Boilers
Standard, Dual Fuel, and Low Emissions Models
2,000,000 - 6,000,000 BTU/HR

Serial/ National Board Number _____

Model _____

Fulton Order _____

Sold To _____

Job Name _____

Date _____

c UL US LISTED

VTG-IOM-2012-1001

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Overview

Prior to shipment, the following inspections and tests are made to ensure the highest standards of manufacturing for our customers:

- Material inspections
- Manufacturing process inspections
- American Society of Mechanical Engineers (ASME) welding inspection
- ASME hydrostatic test inspection
- Electrical components inspection
- Operating test
- Final engineering inspection
- Crating inspection

This manual is provided as a guide to the correct operation and maintenance of your Fulton equipment, and should be read in its entirety and be made permanently available to the staff responsible for the operation of the boiler. It should not, however, be considered as a complete code of practice, nor should it replace existing codes or standards which may be applicable. Fulton reserves the right to change any part of this installation, operation and maintenance manual.

Installation, start-up, and maintenance of this equipment can be hazardous and requires trained, qualified installers and service personnel. **Trained personnel are responsible for the installation, operation, and maintenance of this product, and for the safety assurance of installation, operation, and maintenance processes. Do not install, operate, service or repair any component of this equipment unless you are qualified and fully understand all requirements and procedures. Trained personnel refers to those who have completed Fulton Service School training specific to this product.**

When working on this equipment, observe all warnings, cautions, and notes in literature, on stickers and labels, and any additional safety precautions that apply. Follow all safety codes and wear appropriate safety protection. Follow all jurisdictional codes and consult any jurisdictional authorities prior to installation.

Warnings & Cautions

WARNINGS and CAUTIONS appear in various chapters of this manual. It is critical that all personnel read and adhere to all information contained in WARNINGS and CAUTIONS.

- WARNINGS must be observed to prevent serious injury or death to personnel.
- CAUTIONS must be observed to prevent damage or destruction of equipment or loss of operating effectiveness.

All Warnings and Cautions are for reference and guidance purposes, and do not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes or regulations.

Disclaimers and Local Codes

Installation of the equipment shall conform to all the requirements or all national, state and local codes established by the authorities having jurisdiction or, in the absence of such requirements, in the US to the National Fuel Gas Code ANSI Z223.1/NFPA 54 latest edition, and the specific instructions in this manual. Authorities having jurisdiction should be consulted prior to installation.

When required by local codes, the installation must conform to the American Society of Mechanical Engineers Safety Code for Controls and Safety Devices for Automatically Fired Boilers (ASME CSD-1).

The boiler heat exchanger is manufactured and stamped in accordance with ASME Boiler and Pressure Vessel Code, Section IV for a maximum allowable working pressure and operating temperature of 160 psig and 210 F (99 C) respectively.

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WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

Crystalline silica may be present in components of this equipment. Exposure to crystalline silica may pose significant health hazards, including but not limited to eye and respiratory system damage. Per the Centers for Disease Control and Prevention (CDC) and Occupational Safety and Health Administration (OSHA), appropriate personal protective equipment must be worn to minimize exposure to hazardous substances. Refer to most current guidelines offered by the CDC and OSHA for more information, including personal protective equipment recommendations.

CAUTION

This boiler is certified for indoor installation only. NEMA 3R configuration is available as a factory option; this boiler may not be retrofitted.

This boiler is not designed for use in systems where water is continuously replenished. The warranty is valid for closed loop systems only.

Fulton cannot be held responsible for the selection, engineering, installation, or sizing of any additional equipment or components of the hydronic heating system.

Product Overview

Prior to the performance of installation, operation, or maintenance procedures, personnel should become familiar with the equipment (Table 1) and its components.

The Fulton Vantage hot water boiler is an automatic, fuel-fired, ultra high-efficiency boiler. The boiler can either be of the sealed combustion/direct vent type or utilize conventional combustion air intake and flue methods.

The boiler is capable of sidewall venting when the appropriate venting materials are used, and when permitted by local code requirements.

The Fulton Vantage boiler is certified to Underwriters Laboratories (UL) 795 Issue 2006/10/27 Edition 6 UL Standard for Safety Commercial-Industrial Gas Heating Equipment. The boiler heat exchanger is manufactured and stamped in accordance with American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section IV for a maximum allowable working pressure and temperature of 160 psi and 210 F (99 C) respectively. All Vantage boilers are hydrostatically tested, test fired and shipped as a complete packaged unit.

Fuel, water and electrical connections are similar to other boilers of this type.

There are various burner and control configurations available with the Vantage boiler. Please be aware of which burner and control configuration has been designed specifically for your application.

This Vantage boiler is to be installed as part of a hydronic heating system. A qualified engineer must be consulted for the selection of the equipment and components of the heating system. Various system conditions can result in incorrect heat distribution to users of the heating system.

Each Vantage Boiler is supplied with the following:

- Integrated combustion supervision and temperature operating control
- Operating and high temperature probes in presure vessel
- Low water probe in pressure vessel
- ASME safety relief valve
- Installation and Operation Manual
- Test fire report
- Separate wiring diagram
- Combustion Air Adapter
- Temperature and pressure (T&P) gauge
- 2" drain valve
- 1 can touch up paint
- Reducing bushing for safety relief valve

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The customer should examine the equipment for any damage. It is the responsibility of the installer to ensure all parts supplied with the equipment are fitted in a correct and safe manner.

Placement & Rigging

Proper placement of your Fulton product is essential. Attention paid to the following points will save a great deal of difficulty in the future. Correct placement is the first step to trouble-free installation, operation, and maintenance.

Adhere to the following for placement and rigging:

1. Check building specifications for permissible floor loading. Use Table 1 for unit reference.
2. Conform to all the requirements of all national, state and local codes established by the authorities having jurisdiction and/or the U.S. to the National Fuel Gas Code, latest edition. Authorities having jurisdiction should be consulted before installations are made. Where required by local codes, the installation must conform to American Society of Mechanical Engineers Safety Code for Controls and Safety Devices for Automatically Fired Boilers (ASME CSD-1).
3. Since an external electrical source is utilized, the boiler, when installed, must be electrically ground in accordance with the National Electric Code, American National Standards Institute (ANSI) National Fire Protection Association (NFPA) 70, latest edition.
4. Standard Vantage boilers are certified for indoor installation only. National Electrical Manufacturers Association (NEMA) 3R Configuration is available as an option from the factory, but an existing boiler cannot be retrofitted for outdoor installation.
5. Install so that all system components are protected from water (dripping, spraying, rain, etc.) and debris (dry wall dust, insulation particles, etc.) during boiler operation and service.
6. Install on a level, non-combustible surface in the vertical position. Concrete is strongly recommended.
7. Provide combustion and ventilation air in accordance with applicable provisions of local building codes or: USA – NFPA 54/ANSI Z223.1, Section 5.3, Air for Combustion and Ventilation.
8. Locate the boiler so that the air supply and exhaust piping between the boiler and outside wall/roof are within the maximum lengths for horizontal or vertical venting if sealed combustion will be used. See **Clearances and Serviceability section** of this manual.

WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

Competent personnel in accordance with all applicable local codes should carry out the installation of the Fulton equipment. All state and jurisdictional codes beyond the scope of the applicable ASME Boiler and Pressure Vessel Codes, for its corresponding classification, should be followed in all cases. Jurisdictional authorities must be consulted prior to installation.

A competent rigger experienced in handling heavy equipment should handle rigging your equipment into position.

The equipment must be installed on a non-combustible surface.

Failure to provide required and safe access to the equipment could impede commissioning and maintenance. Service technicians are instructed not to commence commissioning if hazardous conditions exist.

Failure to provide proper minimum clearances between equipment and combustible materials may result in fire.

CAUTION

Do not allow weight to bear on equipment components to prevent damage.

TABLE 1 - BOILER DIMENSIONS AND OPERATING REQUIREMENTS

MODEL VTG		2000	2000DF	2500	2500DF	3000	3000DF	3500	3500DF	4000	4000DF	5000	5000DF	6000	6000DF
Specifications		2000LE				3000LE				4000LE					
Input	Million BTU/Hr.	2	2	2.5	2.5	3	3	3.5	3.5	4	4	5	5	6	6
Fuel Cons. @ rated cap: (Nat. Gas)	FT3/Hr.	2,000	2,000	2,500	2,500	3,000	3,000	3,500	3,500	4,000	4,000	5,000	5,000	6,000	6,000
Fuel Cons. @ rated cap.: (#2 Oil)	GPH	NA	14.3	NA	14.3	NA	21.4	NA	21.4	NA	28.6	NA	28.6	NA	42.8
Output at AHRI Test Condition	BHP	57	57	69	69	86	86	96	96	116	116	138	138	168	168
Electrical Req. (Amps) 230V, 60Hz, 3 Phase		6.8	13.4	12.9	16.1	12.9	16.1	18.5	16.1	18.5	16.1	23	29.2	23	29.2
460V, 60Hz, 3 Phase		3.4	6.7	6.5	8.1	6.5	8.1	9.3	8.1	9.3	8.1	11	16.6	11	16.6
Water Content	Gal	147	147	147	147	215	215	215	215	275	275	275	275	480	480
Dry Weight	LB	3,800	3,800	3,800	3,800	5,200	5,200	5,200	5,200	5,800	5,800	5,800	5,800	8,000	8,000
Operating Weight	LB	5,100	5,100	5,100	5,100	7,000	7,000	7,000	7,000	8,100	8,100	8,100	8,100	12,000	12,000
Dimensions															
A. Boiler Width	IN	30.5	33.6	30.5	33.6	34.6	34.5	34.6	34.5	40.5	40.5	40.5	40.5	48.5	48.5
B. Overall Boiler Height	IN	76	72.8	76	72.8	83.9	76.1	83.9	76.1	87.6	79.5	87.6	79.5	85.5	85.5
C. Overall Boiler Depth	IN	108	120	108	120	120	132	120	132	126	136	136	136	165	165
D. Flue Outlet Diameter	IN	10	10	10	10	12	12	12	12	14	14	14	14	14	14
E. Air Inlet Diameter	IN	8	10	8	10	10	10	10	10	12	12	12	12	12	12
F. Water Inlet/Outlet Diameter	IN	4	4	4	4	4	4	4	4	6	6	6	6	6	6
G. Min. Clearance to Ceiling	IN	24	24	24	24	24	24	24	24	24	24	24	24	24	24
H. Overall Height (w/o blower)	IN	68.1	68.1	68.1	68.1	76.2	76.2	76.2	76.2	79.5	79.5	79.5	79.5	85.5	85.5

* Alternate gas pressure arrangements may apply. Please verify gas pressure ratings for your boiler by viewing the boiler name plate.

** Typical 120 VAC controls allow for a +10% and a -15% voltage fluctuation.

***Standard configurations. Alternate voltages available as an option; please consult factory.

Note: All dimensions are subject to change.

Clearances and Serviceability

Adhere to the following for clearances and serviceability:

1. All local and national codes (NFPA, ANSI, UL, CSA, ASME) must be followed for proper clearances and serviceability for your boiler or heater. Authorities having jurisdiction should be consulted before installations are made.
2. Appropriate front, back, side and top clearances must be maintained (Figure 1). This will allow access around the equipment to facilitate maintenance and a safe work environment. An 1 inch (25.4 mm) side clearance is acceptable between boilers. Custom configurations may not allow 1 inch (25.4 mm) side clearance.
3. Ensure all labels on the boiler will be fully visible for maintenance and inspection.
4. Do not place any boiler room accessories, or other components, on the Vantage skid.

Install Boiler Trim

Each Vantage boiler is supplied with a safety relief valve sized in accordance with ASME requirements. Adhere to the following installation requirements:

1. The safety relief valve (Figure 2) must:
   - » Be connected to the coupling located in the top of the boiler.
   - » Be installed in the vertical position.

➨ *NOTE: Safety relief valve size is determined by trim pressure and is supplied in the trim kit along with appropriate bushing, inlet and outlet sizes. See Table 2.*

2. The discharge pipe must:
   - » Not have a diameter less than the full area of the valve outlet.
   - » Be as short and straight as possible and so arranged as to avoid undue stress on the valve.

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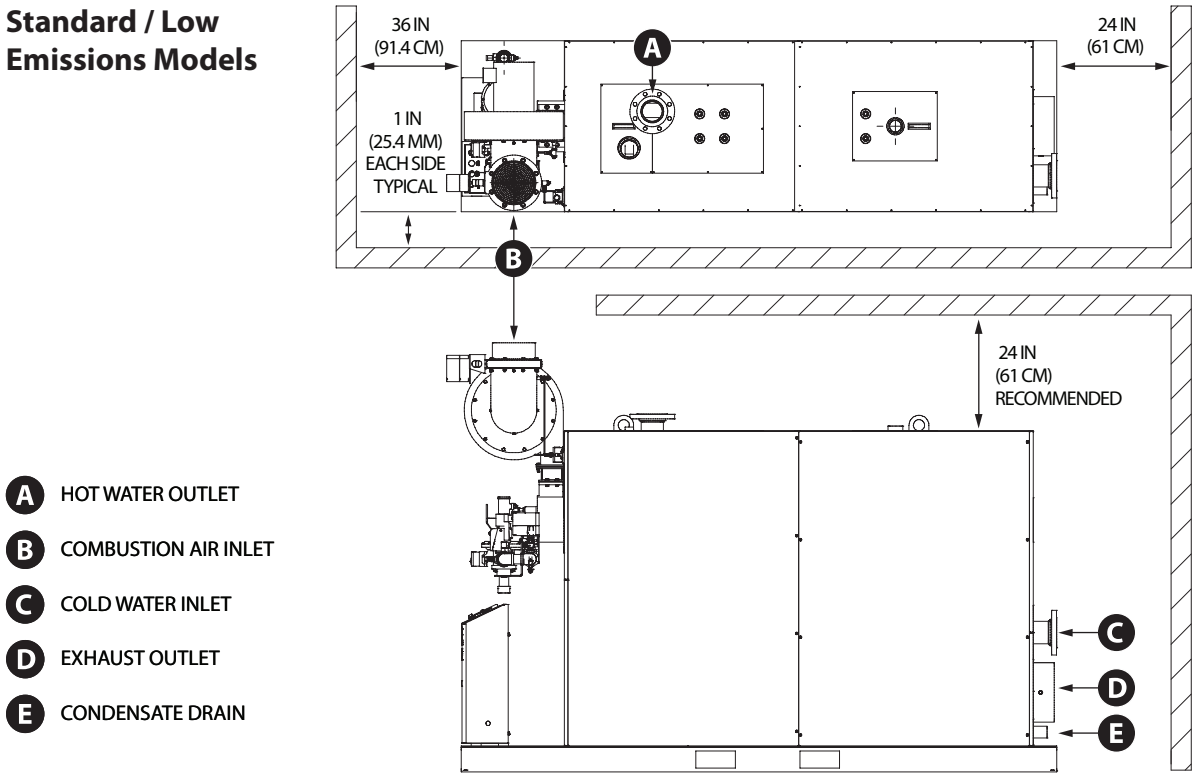
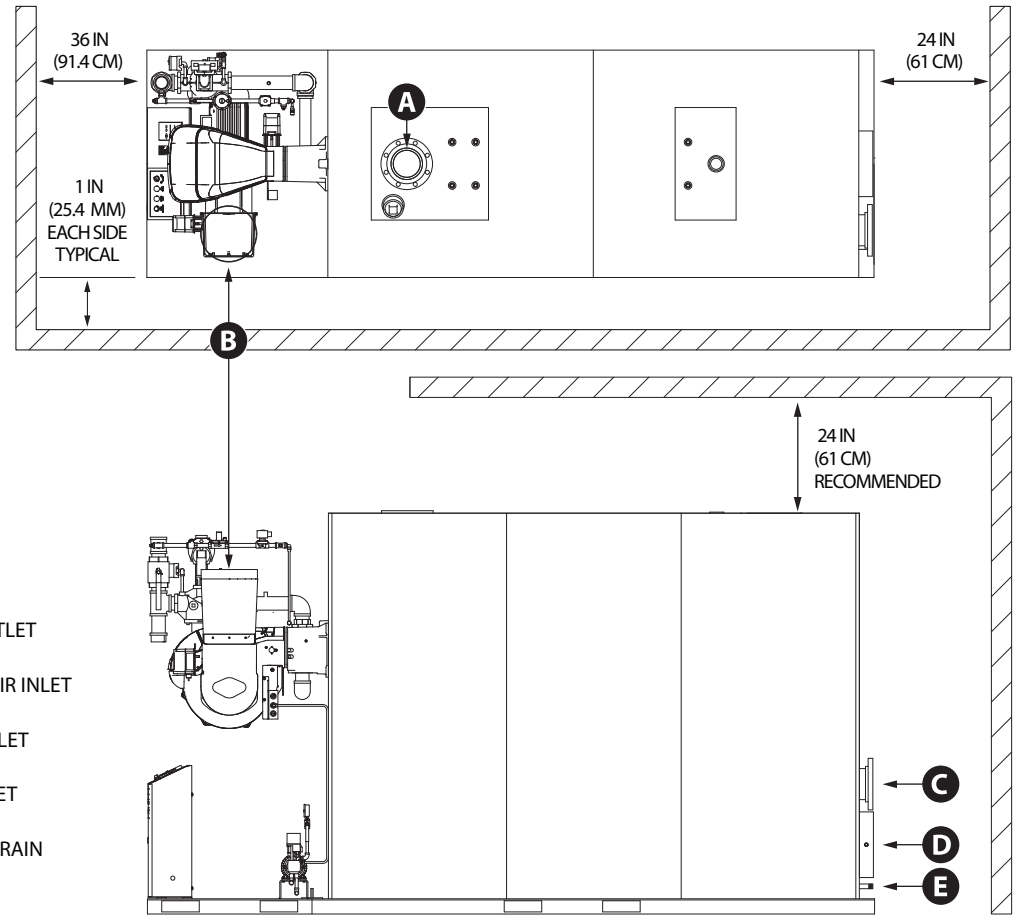
Standard / Low Emissions Models



A HOT WATER OUTLET
B COMBUSTION AIR INLET
C COLD WATER INLET
D EXHAUST OUTLET
E CONDENSATE DRAIN

Dual Fuel Models



A HOT WATER OUTLET
B COMBUSTION AIR INLET
C COLD WATER INLET
D EXHAUST OUTLET
E CONDENSATE DRAIN

FIGURE 1 - VIEWS OF VANTAGE HYDRONIC BOILER (STANDARD, LOW EMISSIONS AND DUAL FUEL MODELS)

» Be supported by means other than the safety valve itself.

» Be piped to avoid danger of scalding personnel.

➨ *NOTE: Each boiler is equipped with a pressure-temperature gauge to be installed in the outlet piping section of the boiler.*

TABLE 2 - SAFETY RELIEF VALVE INLET AND OUTLET SIZES

Model	Trim Pressure (PSI)	Inlet Size; inch (mm)	Outlet Size; inch (mm)
VTG-2000, 2500 (DF, LE)	30	1 1/4 (31.75)	1 1/2 (38.1)
	60	1 (25.4)	1 1/4 (31.75)
	100	3/4 (19.05)	1 (25.4)
	125	3/4 (19.05)	1 (25.4)
	160	3/4 (19.05)	1 (25.4)
VTG-3000, 3500 (DF, LE)	30	1 1/2 (38.1)	2 (50.8)
	60	1 1/4 (31.75)	1 1/2 (38.1)
	100	1 (25.4)	1 1/4 (31.75)
	125	1 (25.4)	1 1/4 (31.75)
	160	3/4 (19.05)	1 (25.4)
VTG-4000, 5000 (DF, LE)	30	2 (50.8)	2 1/2 (63.5)
	60	1 1/2 (38.1)	2 (50.8)
	100	1 1/4 (31.75)	1 1/2 (38.1)
	125	1 (25.4)	1 1/4 (31.75)
	160	1 (25.4)	1 1/4 (31.75)
VTG-6000 (DF)	30	2 (50.8)	2 1/2 (63.5)
	60	1 1/2 (38.1)	2 (50.8)
	100	1 1/4 (31.75)	1 1/2 (38.1)
	125	1 1/4 (31.75)	1 1/2 (38.1)
	160	1 (25.4)	1 1/4 (31.75)

Install Water Piping

All water supplies contain some solids, dissolved gases or dissolved minerals. These may cause corrosion, deposition and/or fouling of equipment. To prevent these contaminants from impacting boiler performance, valve operation and general pipe longevity, each location must be analyzed and treated accordingly.

Adhere to the following for water piping installation (See Figure 3):

1. Isolation valves are recommended on both water connections for ease of service.
2. Install piping so that the boiler is not supporting any additional piping.
3. Install manual purging valves in all loops and zones. Install a pressure-reducing (automatic fill) valve in the cold water fill line to the boiler system. Check that the proposed operation of zone valves, zone circulator(s) and diverting valves will not isolate air separator(s) and/or expansion tank(s) from the boiler. Clearance from hot water pipes to combustibles must be at least 6 inches (152 mm).
4. When used in conjunction with a refrigeration system, install the boiler so that the chilled medium is piped in parallel with the boiler with appropriate valves to prevent the chilled medium from entering the boiler. If the boilers are connected to heating coils (located in air handling units where they may be exposed to refrigerated air circulation) such boiler piping systems must be equipped with flow control valves or other automatic means to prevent gravity circulation of the boiler water during the cooling cycle.
5. Include the following in the mechanical equipment in the hydronic heating system:

   » *An automatic pressure activated water make up valve with back flow preventer.* It must be set to maintain required Net Positive Suction Head (NPSH) for re-circulating pumps, a positive system pressure at the highest point of at least 5-10 PSIG, and make up water valve should be designed to add water to the system at the outlet of the boiler and should not be fed directly into the boiler.

   » *Air removal equipment, including an air separator and automatic breather valves, along with a functioning expansion tank* . Each must be designed to system specifications.

➨ *NOTE: The water connection on the top of the boiler is the outlet connection. The water connection on the rear of the boiler is the inlet connection.*

➨ *NOTE: The Fulton Vantage boiler does not require a primary/secondary flow piping system. Although primary/secondary is an acceptable configuration, the boiler does not have a minimum return water temperature requirement (when firing on natural gas or propane) and the heat exchanger will not be harmed by low flow or zero flow conditions. See Figure 3 for a sample piping layout.*

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6. Install filtration to remove particulates if appropriate.
7. Install bypass chemical feeder for corrosion inhibitor maintenance if appropriate.
8. Install corrosion coupon holder to assess corrosion inhibitor performance if appropriate.

➨ *NOTE: The boiler is provided with a drain valve connection and a drain valve. See Figure 4.*

9. Before installing a Vantage boiler into a hydronic loop, be sure that the system piping and any other components of the system are clean and free of debris and any foreign matter. The hydronic system is completely flushed prior to installing the boiler itself.

➨ *NOTE: Although motorized isolation valves are not required in a primary only arrangement , they can help ensure system effectiveness. Proper control strategy must be used to ensure flow paths in the hydronic loop and residual heat in pressure vessel can be adequately dispersed when a boiler is disabled.*

Meet Water Chemistry Requirements

System water chemistry requirements are as follows:

- pH: Range of 8.5 - 10.5
- Oxygen: Less than 250 ppb (operating condition)
- Total Iron/Copper: Less than 5 ppm
- Corrosion Inhibitor: Capable of maintaining iron corrosion rates <2 mpy. Due to changing environmental restrictions a non-heavy metal ALL ORGANIC inhibitor is recommended which is designed for multi metal systems including ferrous metals and yellow metals such as copper and brass.
- Chloride: Less than 250 ppm

Adhere to the following:

1. Refer to your water conditioning or chemical treatment supplier for analysis and recommendations for proper system conditions.
2. Follow a program with appropriate monitoring and maintenance of system water conditions as provided by your water conditioning or chemical treatment supplier.
3. If RO/DI water is used as a source for hydronic loop water or makeup water, it must be neutralized to a pH of 8.5 - 10.5 prior to entering the boiler. Failure to neutralize the RO/DI water will void the pressure vessel warranty and may cause high general corrosion rates.

WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

The discharge from the safety relief valve must be arranged to ensure no danger of scalding personnel, or equipment damage.

Provisions must be made to properly pipe the safety relief discharge away from the boiler to the point of discharge.

No shutoff of any kind shall be placed between the safety relief valve and the boiler, or in the discharge pipe between the valve and the atmosphere. Doing so may cause an explosion from overpressure.

The hydronic system should never be flushed while the boiler is attached to the system since the debris could accumulate in the boiler and block water from passing through the heat exchanger.

Ensure all labels on the boiler are legible. All connections and safety devices, both mechanical and electrical, must be kept clean, with ease of access for inspection, use and maintenance.

Do not store or use gasoline or other flammable vapors and liquids or corrosive materials in the vicinity of this or any other appliances.

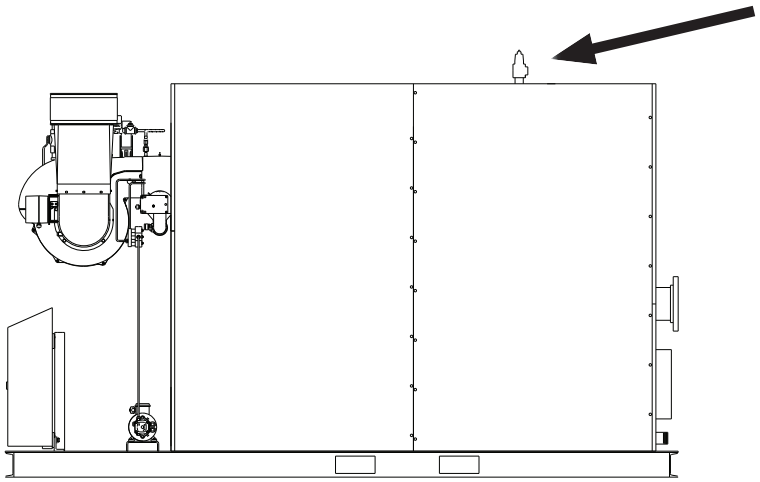

FIGURE 2 - SAFETY VALVE LOCATION

Note: Valve is shipped loose and must be installed by the contractor.

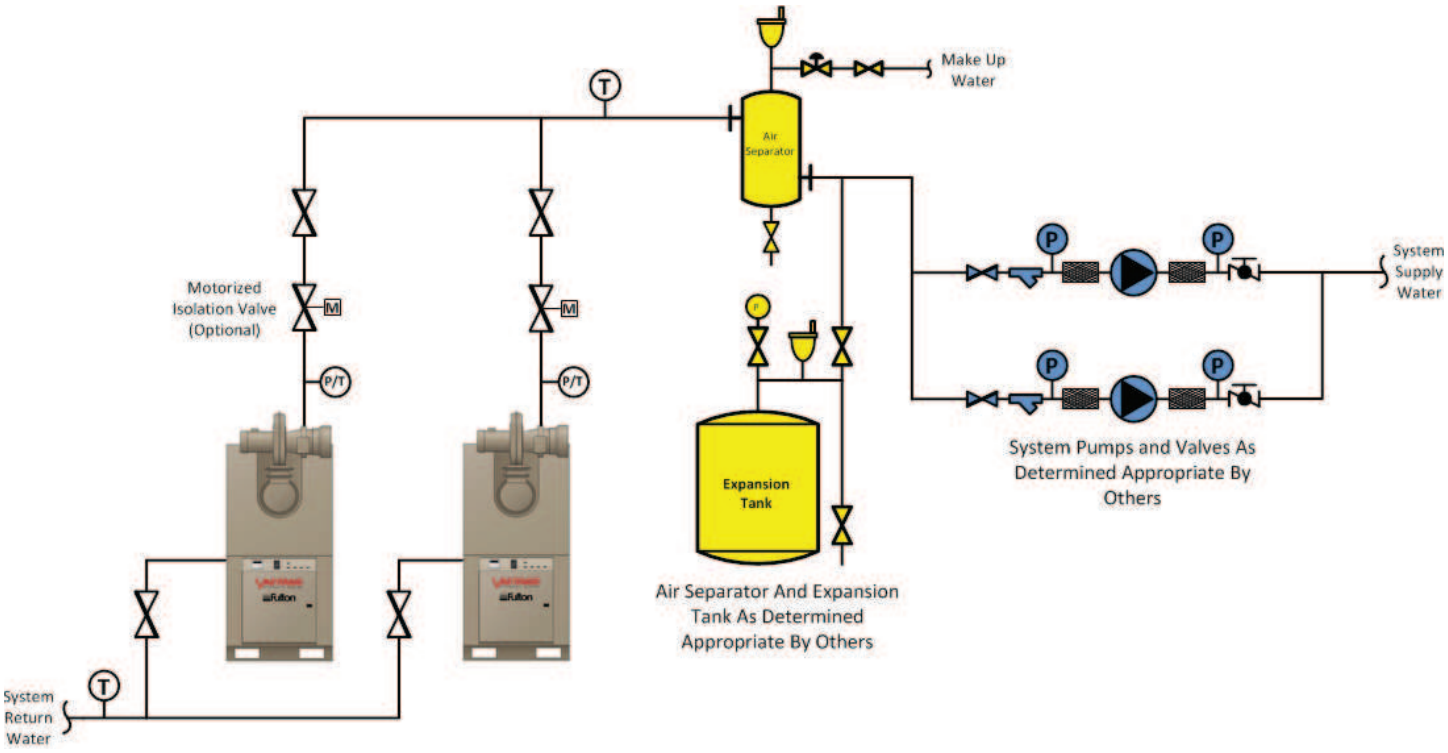
Make Up Water
Air Separator
Motorized Isolation Valve (Optional)
System Supply Water
System Pumps and Valves As Determined Appropriate By Others
Expansion Tank
Air Separator And Expansion Tank As Determined Appropriate By Others
System Return Water

FIGURE 3 - SAMPLE PIPING LAYOUT

Note: Sample piping layout (P&ID) is a general representation of system installation. Good practice should be used in system design, including but not limited to adequate pipe/valve sizing and natural flow path for system water.

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- The system must have an automatic pH controller to monitor and log the
- levels. This must be independent of other chemical feed systems.
- Makeup water pH range must be 7.5 - 8.8; the boiler water must be maintained within pH range of 8.5 - 10.5.

4. Operate the boiler in a closed-loop system using water or water/glycol (not requiring a make-up water supply). A large amount of improperly treated make-up water can cause premature failure of the heat exchanger resulting from scale build up. Scale build up will reduce the efficiency and useful life of the boiler and is not covered under warranty.

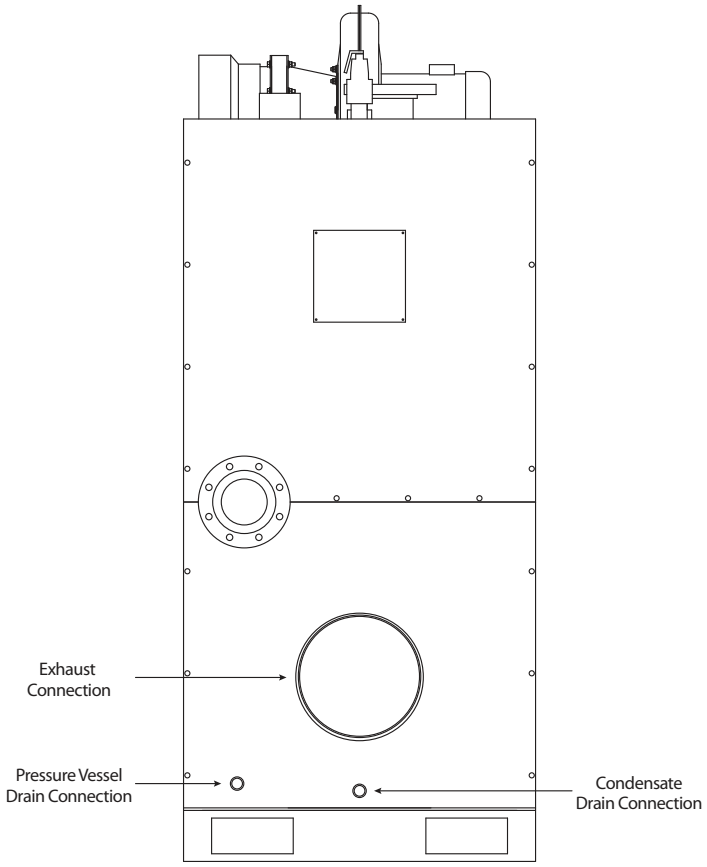

FIGURE 4 - DRAIN CONNECTION AND EXHAUST CONNECTION LOCATIONS

Prevent Oxygen Contamination

There are several ways to prevent boiler water oxygen contamination:

- Minimize system leaks to minimize make up water requirement
- Do not use open tanks or fittings
- Do not use oxygen permeable materials anywhere in the water system
- Repair leaks in the system quickly
- Eliminate fittings wherever possible
- Use air elimination devices in system piping

CAUTION

Care needs to be taken to eliminate oxygen from the water system, as excess oxygen in the system will reduce the life of any boiler. The boiler warranty does not cover heat exchanger replacement due to oxygen contamination of boiler water.

Heat exchanger failure due to inappropriate water quality, foreign matter or debris damage is not covered under the warranty.

If the piping system attached to this unit will be chemically cleaned, the boiler must be disconnected from the system and a bypass installed so that the chemical cleaning solution does not circulate through the boiler.

■ Eliminate System Air

➨ *NOTE: There are no built-in boiler air eliminating features.*

Adhere to the following for air elimination:

1. The installation of an air separator and air eliminator (air vent) is required.
2. To prevent scale corrosion in boiler and associated piping, make up water must be kept to a minimum. This is best achieved by ensuring immediate repair of all leaks and that system pressure is maintained.
3. If a sealed diaphragm-type expansion tank is used, install an air eliminator in the hot water piping at the air separator.
4. If an air cushion type expansion tank is used, pipe tank directly into boiler supply.
5. On multi-zoned systems (or a system with both space and domestic water heating), air elimination must be provided either in the common piping or on every loop.
6. When the boiler is installed at a higher level than baseboard radiation (if used), air elimination must be provided directly above the unit.

Fill the Boiler With Water

To be sure that the boiler is not air-bound, open the pressure-relief valve located at the rear of the boiler. Leave the relief valve open until a steady flow of water is observed. Close the valve and finish filling the system.

Install Gas Piping

The Vantage boiler is factory test fired and combustion is adjusted per the boiler data plate and test fire sheet.

The gas train components are UL-795 certified to operate at specific gas pressure requirements. The specific requirements for each boiler are called out on the boiler nameplate, located on the back of the boiler. Parameters depend on fuel(s) for which the boiler is designed.

Adhere to the following for gas piping installation:

1. See Table 3 for required natural gas pipe size, based on overall length of pipe from the meter plus equivalent length of all fittings. Approximate sizing may be based on 1,020 BTU for 1 cubic foot of natural gas.
2. Piping must be installed such that no piping stresses are transmitted to the boiler. The boiler cannot be used as a pipe anchor.
3. The boiler and all gas piping connections must be pressure-tested and checked for leaks before being placed into service. Test with compressed air or inert gas if possible.
4. The boiler must be disconnected at the boiler manual shutoff valve (located at the end of the supplied gas train) from the gas supply piping system during any pressure testing of the system at pressures in excess of 1/2 psig (14 inch W.C.).
5. Gas Piping must be installed in accordance with National Fuel Gas Code, ANSI Z223.1 1991 or latest addenda and any other local codes, which may apply.
6. The pipe and the fittings used must be new and free of dirt or other deposits.
7. Piping must be of the proper size to ensure adequate gas supply. A drip leg and union connection must be installed upstream of the gas safety shut off valves and must be a 5 inch (127 mm) minimum length.
8. Connect gas supply line to the open end of the tee on which the drip leg is installed.
9. When making gas-piping joints, use a sealing compound resistant to liquefied petroleum gases. Do not use Teflon tape on gas line threads.
10. After gas piping is completed and before wiring installation is started, carefully check all piping connections, (factory and field), for gas leaks. Use a soap and water solution.
11. The boiler must be disconnected at the boiler shut off valve from the gas supply piping system during any pressure testing of the system.

➨ *NOTE: The vent line connection on the gas pressure regulator must be piped to outdoor air by the installer in accordance with the National Fuel Gas Code, ANSI Z223.1-1991 or latest addenda. In Canada gas installations must by in accordance with the current CAN/CSA B149.1 and 2 and/or local codes.*

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■ Components Requiring Ventilation to the Outdoors

Although there are custom fuel train requirements available that do not include components requiring ventilation to the outdoors, many Vantage fuel trains will require a vent line on the high gas pressure switch and the gas pressure regulator.

Follow the recommendations of the manufacturer of the gas pressure regulator for specific instructions. General instructions include:

- Start with the vent tapping size, and as soon as is practical increase the pipe size one diameter.
- For every ten feet of pipe run, increase the pipe size one diameter.
- Protect the termination from water, dust and insects.

Install Condensate Drain

A condensate drain kit is intended for use with the Fulton Vantage boiler. The Condensate Drain is Fulton Model Part Number 4-57-000440.

Adhere to the following for installation:

1. The 1" condensate drain will be connected to the 1" inlet on the drain kit. One or more drain lines may be connected to this inlet (max of 12 MM BTU per drain).
2. If the water supply must be temporarily disconnected, the boilers must be turned off to prevent accidental flue gas emission into the boiler room.
3. The condensate drain cover must be kept on at all times, except during maintenance of the drain. This drain should be checked regularly in your boiler maintenance schedule.
4. A condensate collecting tank and condensate pump will be required if a floor drain is not available to collect condensate (collecting tank and pump are not supplied with the boiler).
5. All piping (Figure 5) must be galvanized, or stainless steel and should be free of leaks. Copper, carbon steel/iron pipe, PVC or CPVC are not acceptable.
6. Connect 1" condensate drain(s) (at the rear of the boiler), to the 1" inlet at the base of the drain tank. The bottom of the drain kit must be a minimum of 5.5" lower than the bottom of the boiler when connected in a manifold as shown in Figure 5, the manifold must be 5.5" below the condensate outlet and must remain flooded.
7. Connect the 1.5" drain outlet to an appropriate waste line following applicable codes. The 1.5" drain connection on the drain tank must be the highest point prior to going to the drain. Failure to keep drain piping lower than this point will result in overflow of the drain tank. Slope the drain pipe away at a minimum pitch of 1 inch (25.4 mm) for every 12 feet (3.65 m).

WARNING

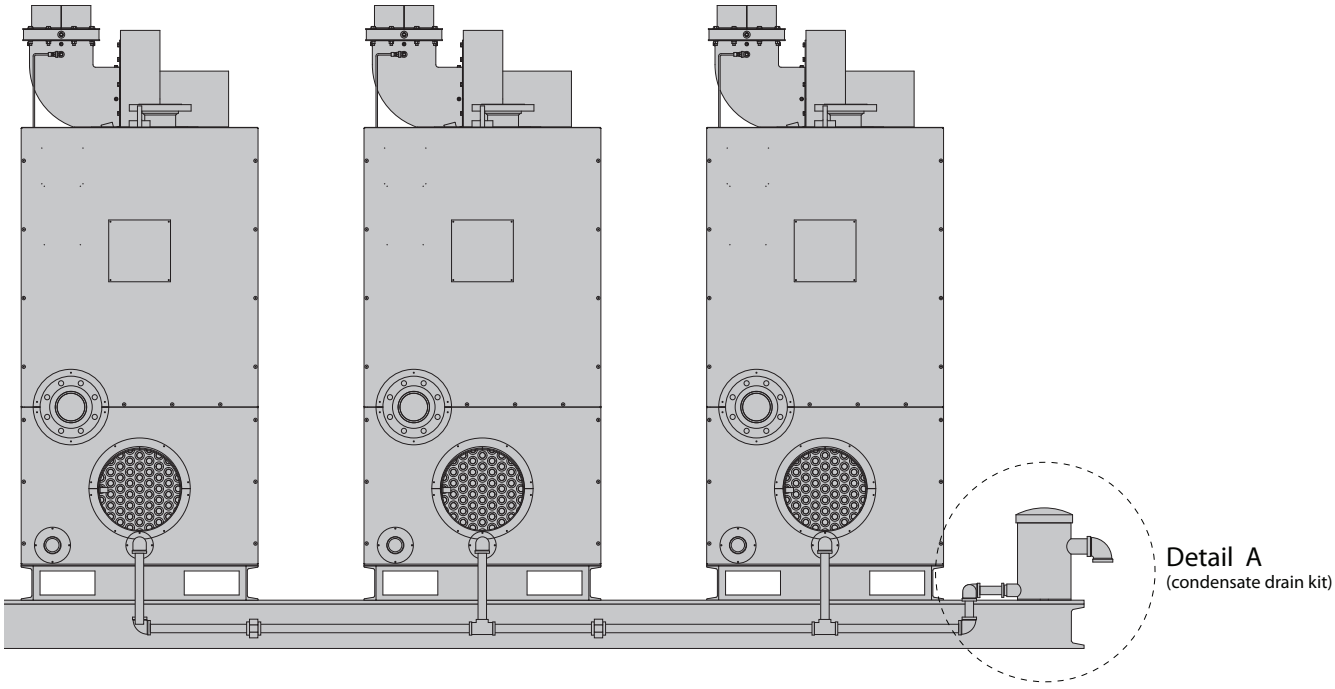
All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

Do not use matches, candles, flame or other sources of ignition to check for gas leaks.

CAUTION

Some soap used for leak testing is corrosive to certain types of metals. Clean all piping thoroughly after completing the leak check.

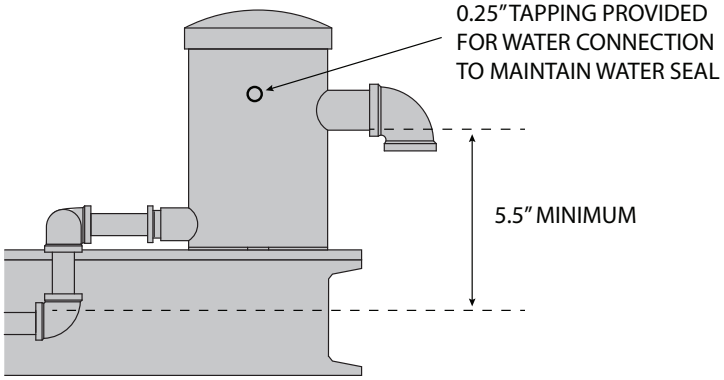
FIGURE 5 - CONDENSATE DRAIN PIPING FOR VANTAGE BOILERS



SIDE VIEW

Figure 5 Notes:

- Header must be level or slightly pitched toward the drain.
- Header material to be galvanized steel or 316L stainless.
- Header should be taken to the lowest point possible and at least 5.5 inch drop from 1.5 inch condensate drain kit/trap outlet.
- 1.5 inch condensate drain kit/trap outlet is never to be above 1 inch boiler condensate outlet.
- For multiple boiler installation, maintain and minimum pipe size of 1 inch for the header piping.
- The maximum number of units to attach per condensate drain kit is 12mm BTU total.



Detail A

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TABLE 3 - NOMINAL PIPE SIZE

Nominal Pipe Size	ID	Equivalent Pipe Length		Max Capacity in ft3 of natural gas per hour. Pressure drop of 0.5"wc/Equivalent length of pipe (feet)						
(")	(")	90 Elb (Feet)	Tee (Feet)	20	40	60	80	100	150	200
1-1/4	1.380	3.45	6.9	950	-----	-----	-----	-----	-----	-----
1-1/2	1.610	4.02	8.04	1460	990	810	-----	-----	-----	-----
2	2.067	5.17	10.3	2750	1900	1520	1300	1150	950	800
2-1/2	2.469	6.16	12.3	4350	3000	2400	2050	1850	1500	1280
3	3.068	7.67	15.3	7700	5300	4300	3700	3250	2650	2280
4	4.026	10.1	20.2	15800	10900	8800	7500	6700	5500	4600
6	6.07	10.10	23.60	-----	-----	-----	-----	20200	16503	12766
8	7.98	13.30	29.10	-----	-----	-----	-----	41200	33660	29128

8. Attach a ¼" water supply to the compression fitting on the float. The water line must be connected to an uninterruptible supply. Fulton recommends connecting it before the "fast fill" valve to the boiler supply but after the back flow preventer to avoid contamination of a potable water supply. Maximum allowable water pressure to the compression fitting is 100 PSI.

Install pH Neutralization Kit

The pH Neutralization Kit is a Fulton-provided kit designed to bring the pH level of the boiler's condensate to a neutral level. It is not a replacement or alternative for the Condensate Drain Trap. See Figure 6.

Adhere to the following for installation:

1. Use stainless or galvanized pipe and fittings to connect condensate drain to kit.
2. Connect kit downstream of Condensate Drain Trap. See Figure 7.
3. Pipe outlet to appropriate drain.

➨ *NOTE: Replacement bags are available from the Fulton Parts Department. The medium in the container will neutralize the condensate of 12 MM Btu's for approximately 6 months.*

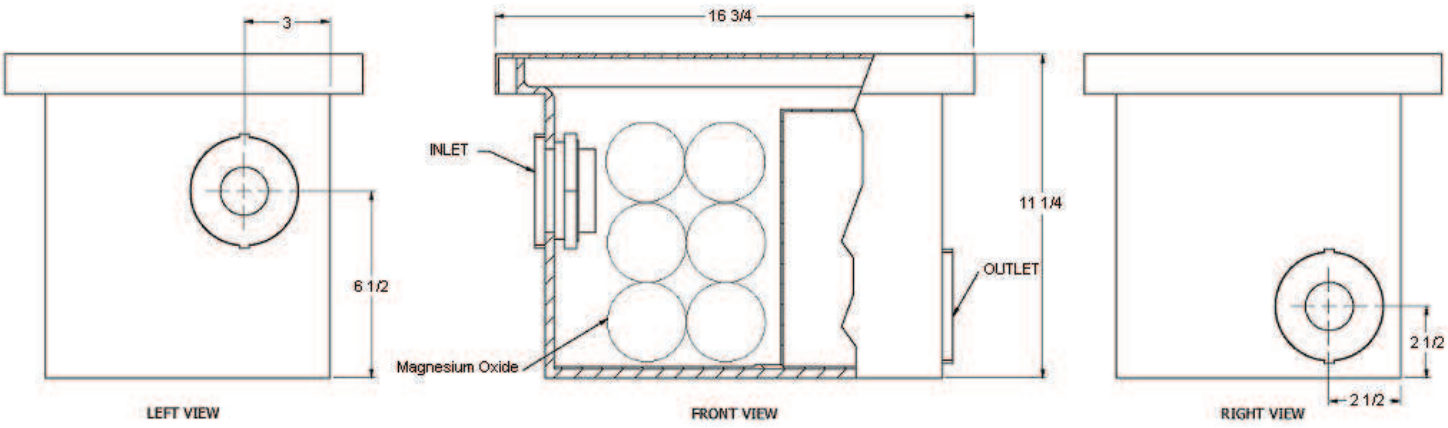

FIGURE 6 -- FULTON PH NEUTRALIZING KIT (WITHOUT PUMP)

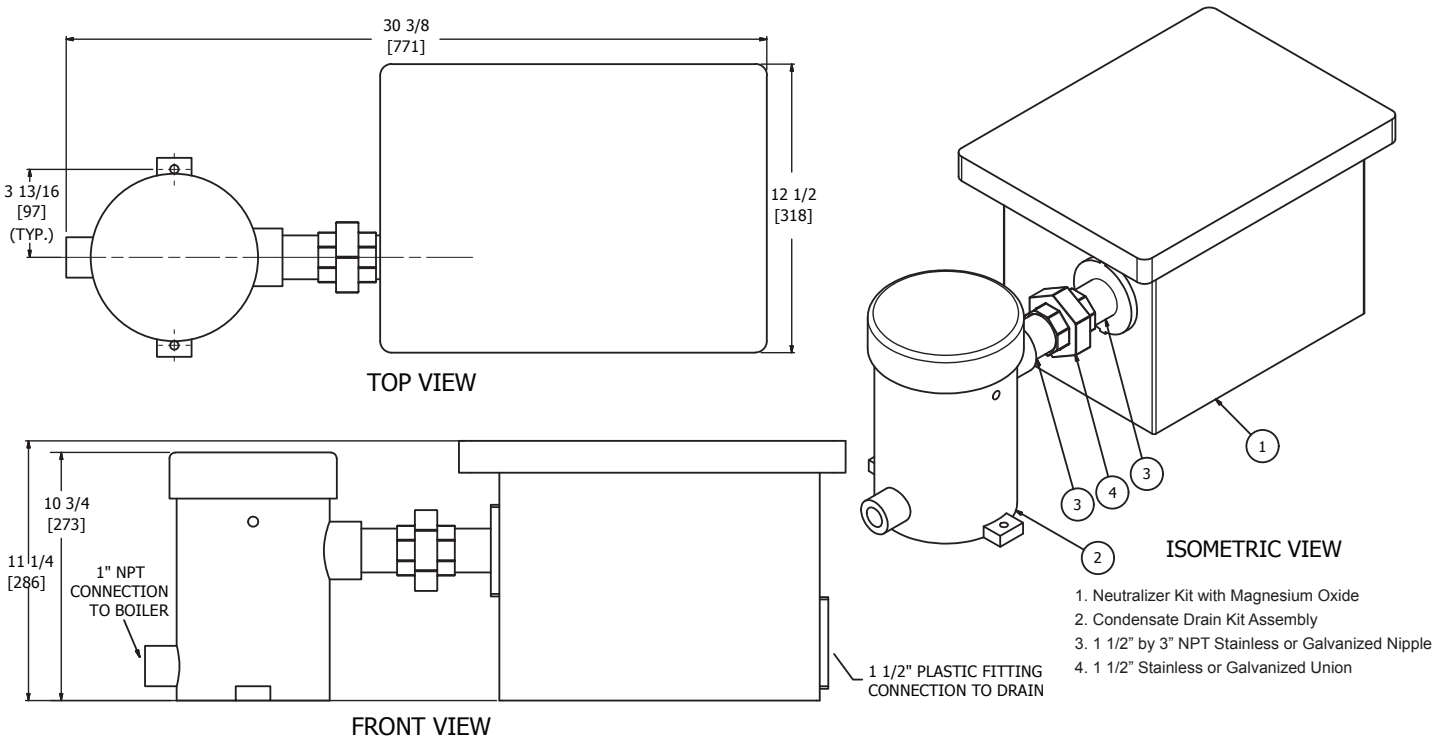

FIGURE 7 - FIELD CONNECTIONS FOR CONDENSATE DRAIN TO PH NEUTRALIZATION TANK

Install Oil Piping

■ Oil Piping (For Dual Fuel Boilers with the Riello Burner)

Adhere to the following for dual fuel boilers with the Riello Burner (see Figure 8):

1. The Vantage dual fuel boiler is suitable for firing light distillate fuel oil, commonly known as #2 fuel oil only. DO NOT USE GASOLINE, CRANKCASE OIL OR ANY OIL CONTAINING GASOLINE. If in doubt, contact your Fulton representative prior to operation.

2. Fuel pipes must be of approved materials and of a diameter suitable for the quantity of oil being delivered to the burner and the static head available. A stop valve and fire valve assembly should be supplied by the client/contractor. In addition a check valve must be fitted into the return pipe.

3. Be sure to install a foot valve as indicated in Figure 8. The foot valve is a check valve for the oil line between the oil pump on the boiler and the supply tank. The foot valve keeps the oil line charged at all times.

4. The maximum pressure allowed at the fuel oil pump inlet is limited to 3 PSIG by the National Fire Protection Association (NFPA). If the fuel supply can exceed this maximum, a regulator must be installed. The minimum pressure at the pump inlet should never exceed 10" of vacuum.

5. The oil pump (Figure 9) on the Vantage boiler is a SUNTEC model AJ4CC or acceptable alternate. See Figure 7. No settings are required for the pump, which is set to 198-200 PSI by the manufacturer. This pressure must be checked and adjusted (if required) after the burner has been ignited. There is a pressure gauge provided with the oil pump assembly on the boiler so pressure can be monitored.

6. The oil piping system should be a 2-pipe system. The delivery rate of oil to the boiler will be greater than the fuel consumption rate of the boiler. The oil that is not consumed should be returned to storage. Consult a qualified professional for assistance in designing and installing oil delivery systems. See Figure 10.

7. Fuel Supply: The pumping unit of the burner is equipped with a self-priming pump, which is capable of feeding itself within the limits listed in the table in Figure 9.

8. It's good practice to ensure that the return and suction

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lines enter the pump from the same height; in this way it will be more improbable that the suction line fails to prime or stops priming.

Hydraulic Connections

Adhere to the following for hydraulic connections:

1. The oil pumps are equipped with a by-pass that separates the return line and suction line. The pumps are installed on the pumping unit with the by-pass closed. It is necessary to connect both hoses to the pump.
2. Damage to the pump seal will occur immediately if it is run with the return line closed and the by-pass screw inserted.

Oil Pump Priming

Adhere to the following for pump priming:

1. Before starting the burner, make sure that the tank return line is not clogged. Obstructions in the line could cause damage to the pump seal.
2. The pump leaves the factory with the by-pass closed. Check to make sure that the valves located on the suction line are open and that there is sufficient fuel in the tank.
3. For self-priming to take place, one of the screws of the pump must be loosened in order to bleed off the air contained in the suction line.

Oil Filtration

The oil supply to the Vantage boiler should be filtered and be free of debris. Regular maintenance of the filter is required (as per the filter manufacturer's recommendations) to maintain the Vantage warranty. It is the responsibility of the installing contractor to provide adequate filtration for the oil supply system.

Venting

Adhere to the following venting requirements:

1. The Vantage boiler can operate to the combined intake and flue pressure drops without altering standard capacities: See Table 4.
2. The pressure drop readings at the boiler exhaust connection and air intake connection cannot exceed the maximum value stated in Table 4. This means that the combined pressure drop through the air intake venting (if installed) and exhaust venting cannot exceed the maximum value stated in Table 4; this is typically approximately 35 feet and 4 elbows of connection size piping. If exceeded, the boiler will have to be de-rated or operational issues will result. Also, the pressure at the boiler exhaust connection must not exceed a maximum negative value as stated in the table. This pressure must remain relatively constant throughout the operation of the boiler.

WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

DO NOT USE GASOLINE, CRANKCASE OIL OR ANY OIL CONTAINING GASOLINE. If in doubt, contact your Fulton representative prior to operation.

Do not store or use gasoline or other flammable vapors and liquids or corrosive materials in the vicinity of this or any other appliances. Cements for plastic pipe should be kept away from all sources of ignition. Proper ventilation should be maintained to reduce the hazard and to minimize breathing of cement vapors.

Damage to the pump seal will occur immediately if it is run with the return line closed and the by-pass screw inserted.

The minimum return water temperature to the boiler is 160 F when firing on oil. Failure to maintain this will void the warranty.

If the water supply must be temporarily disconnected from the condensate drain trap, the boilers must be turned off to prevent accidental flue gas emission into the boiler room.

CAUTION

An uninterruptible water supply is required and shall be connected to the ¼" compression fitting on the condensate drain. The water supply maintains a water level in the drain kit to prevent accidental flue gas emission into the boiler room.

FIGURE 8 - OIL PUMP LOCATION

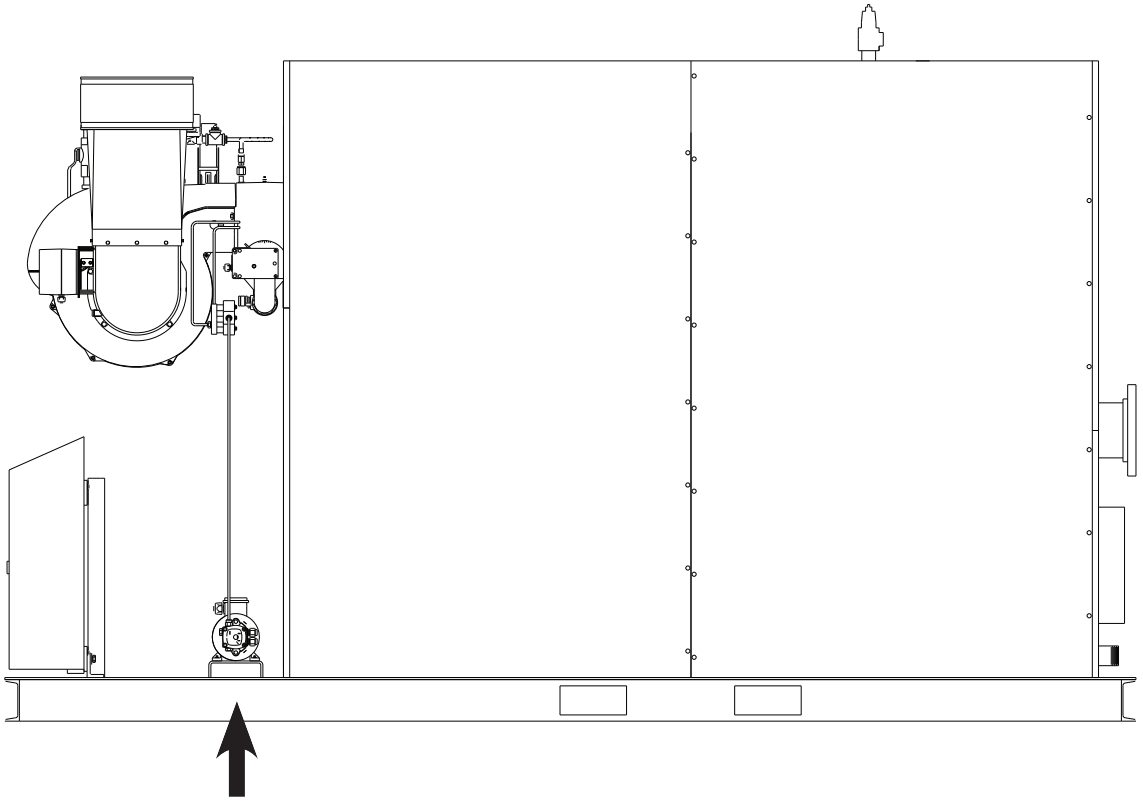

FIGURE 9 - OIL PUMP DETAILS

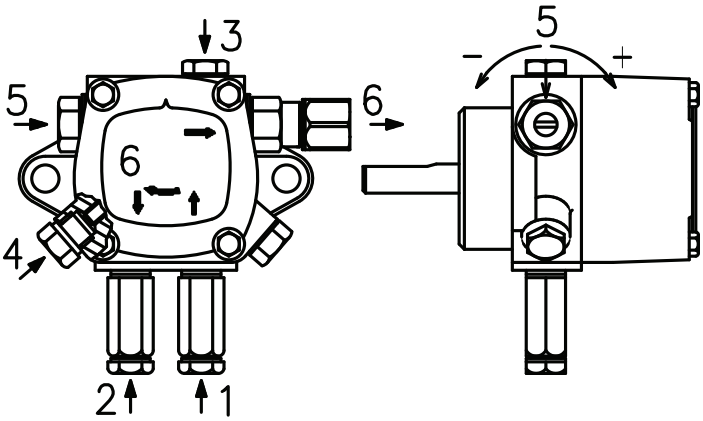

Figure 9 Notes

	Characteristic	Connection
1	Suction	3/8" NPT (Piped in the Field)
2	Return	3/8" NPT (Piped in the Field)
3	Pressure Gauge Attachment	G 1/8" (Completed at Factory)
4	Vacuum Gauge Attachment	G 1/8" (Completed at Factory)
5	Pressure Regulator	
6	Outlet to Burner	¼" NPT (Completed at Factory)
	Minimum Delivery Rate at 174 PSI Pressure	54 GPH
	Delivery Pressure Range	145 – 290 PSI
	Maximum Suction	13 " Hg
	Oil Viscosity Range	2.8 – 75 cSt
	Maximum Fuel Oil Temperature	140 F
	Maximum Suction and Return Pressure	29 PSI
	Pressure Calibration at the Factory	198-200 PSI
	Filter Mesh Width	0.006 Inches

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FIGURE 10 - FUEL SUPPLY

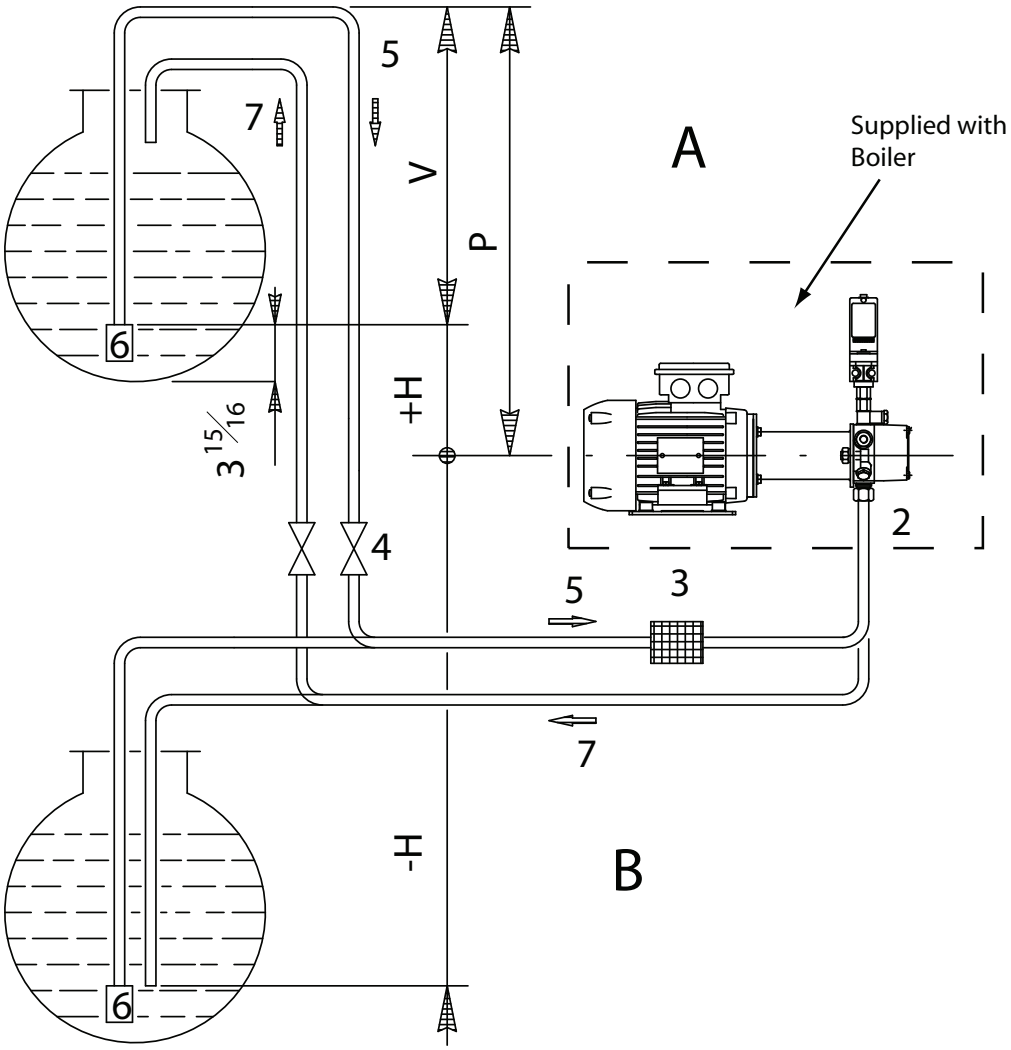

Figure 10 Legend and Notes

H Pump/Foot valve height difference
L Piping length
O Inside Pipe Diameter
2 Pump
3 Filter
4 Manual On/Off Valve
5 Suction Line
6 Foot Valve
7 Return Line

1. The tank is higher than the pumping unit (A): The distance "P" must not exceed 33 ft in order to avoid subjecting the pump's seal to excessive strain; the distance "V" must not exceed 13 ft in order to permit pump self priming even when the tank is almost completely empty.

2. The tank is lower than the pumping unit (B): Pump suction pressures higher than 13"Hg for Suntec oil pump and 15"Hg for Webster 2 Stage 22R oil pump must not be exceeded. This is because at higher levels, gas is released from the fuel and the pump starts making noise and its working life-span decreases.

Drastic draft changes during operation may result in generation of excessive carbon monoxide or soot. To decrease termination noise, increase the venting size at the termination points. This will slow the air velocity causing a reduction in noise. Do not terminate the venting in an enclosed area. Care must be taken when selecting the orientation of the terminations.

➨ *NOTE: Consult your venting pipe supplier for assistance with sizing of vent materials and other potentially required accessories.*

3. Do not use boot tees or bullhead tees.
4. Barometric dampers should never be used in a condensing boiler application even if the draft is negative, this is because barometric dampers physically open to the mechanical room and it will be possible for flue gas condensate to drain down the outside of the stack.
5. The air intake system must be designed to prevent any moisture from draining to the boiler.
6. The layout of the piping used for air intake and exhaust must be done in a way that facilitates smooth travel and natural flow. Performing a pressure drop calculation isn't enough information to make sure a draft system will perform adequately. Good practice must be used by the designer and installer. Some recommendations:
    - Avoid sharp turns, boot tees, bullhead tees, back-to-back 90 degree elbows, short radius elbows especially right at the connections to the boilers
    - Avoid extensive direction changes (flue gases being required to turn around)
    - Never direct flue stacks in a downward direction.

TABLE 4 - GENERAL VENTING REQUIREMENTS

Vantage Model Number	Maximum Negative Draft	Maximum Positive Draft
VTG-2000	-0.04 " W.C.	+0.35 " W.C.
VTG-2500, 2500DF	-0.04 " W.C.	+0.35 " W.C.
VTG-3000	-0.04 " W.C.	+0.35 " W.C.
VTG-3500, 3500DF	-0.04 " W.C.	+0.35 " W.C.
VTG-4000	-0.04 " W.C.	+0.35 " W.C.
VTG-5000, 5000DF	-0.04 " W.C.	+0.35 " W.C.
VTG-6000	-0.04 " W.C.	+0.35 " W.C.
VTG-2000DF	-0.1 " W.C.	+0.40 " W.C.
VTG-3000DF	-0.1 " W.C.	+0.50 " W.C.
VTG-4000DF, 4000LE	-0.1 " W.C.	+0.50 " W.C.
VTG-3000LE	-0.04" W.C.	+0.50 " W.C.

7. Make-up air ventilation openings are recommended for each installation size in Table 5:

TABLE 5 - MAKE-UP AIR VENTILATION OPENINGS

Total Input of boiler (1000 BTU/HR)	Free Area (square feet)
2000	**6**
2500	**9**
3000	**11**
3500	**13**
4000	**14**
5000	**18**
6000	**21**

8. For multiple boiler installations, multiply the number of boilers by required free area per boiler.
9. The installation of exhaust fans in a boiler room is not recommended.
10. An exhaust fan or similar equipment can create down draft in the stack or restrict the burner's air supply which will result in poor combustion. It is essential that only fresh air is allowed to enter the combustion air system. Foreign substances, such as combustible volatiles in the combustion system can create hazardous conditions. If foreign substances can enter the air stream, the boiler combustion air inlet must be piped to an outside location. Failure to do so will void the warranty.

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11. Particulate matter or chemicals (example: perchlorethylene, halogenated compounds) in the combustion air supply to the boiler will cause damage or failure to the burner and is not covered under warranty. High-risk situations for particulate matter to be in the air include construction and maintenance activities.
12. In Canada, for recommended practice, refer to CSAB1.

■ Combustion Air Supply From the Boiler Room

Adhere to the following for installation:

1. Adequate combustion air and ventilation must be supplied to the boiler room in accordance with local codes and NFPA54/ANSI Z233.1, Section 5.3, Air for combustion and ventilation.
2. The boiler room must meet the NFPA criteria for a non-confined space.
3. It is important to provide free access of air to the boiler. Per ASME Section VI Para. 6.04 and NBIC, unobstructed air ventilation openings (one near ceiling, one near floor) should be sized on the basis of one square inch free area per 2000 BTU/HR maximum fuel input of the combined burners located in the boiler room. This is subject to state and local regulations.
4. Consistent proper ventilation of the boiler room is essential for good combustion. Install two fresh air openings, one at a low level, 24" (610 mm).
5. Boiler room pressure must be neutral relative to the outdoors.

■ Air Piped From Outside Boiler Room

Adhere to the following for installation:

1. The combustion air supply can be piped directly to the air inlet (Figure 11) of the boiler.
2. A rubber air intake coupling is supplied with boilers specified for installation with ducted air supply. It must be used to connect the intake piping to the boiler air inlet.
3. The air intake must be piped out of the building if the boiler room contains contaminated air.
4. Air Intake pipes and fittings shall be Schedule 40 PVC pipe or galvanized steel. All Schedule 40 PVC pipe, fittings, primer and cement must conform to American National Standard Institute and the American Society for Testing and Materials (ANSI/ASTM standards.)
5. Intake PVC piping must be assembled using cement. This will ensure that the intake is air tight and will not allow contaminates from the boiler room into the boiler. The cement must be free flowing and contain no lumps, undissolved particles or any foreign matter that adversely affects the joint strength or chemical resistance of the cement. The cement must not show gelation, stratification, or separation that cannot be removed by stirring.
6. Adhere to procedure for cementing joints (per ASTM D2855).

WARNING

Cements for plastic pipe are flammable liquids and should be kept away from all sources of ignition. Proper ventilation should be maintained to reduce the hazard and to minimize breathing of cement vapors. Avoid contact of cement with skin and eyes.

Never install a barometric damper on flue systems designed with positive pressure.

Assure all electrical connections are powered down prior to attempting replacement or service of electrical components or connections of the boiler.

Do not use the boiler/burner as support for ducted air piping. Ducted piping must be supported independently of the boiler.

Particulate matter or chemicals in the combustion air supply to the boiler will cause damage or failure to the burner and is not covered under warranty.

WARNING

Do not terminate venting into an enclosed area.

Never use open flame or smoke from a cigarette, cigar, or pipe as a testing method during boiler installation, operation, or maintenance.

Foreign substances, such as combustible volatiles in the combustion system can create hazardous conditions. If foreign substances can enter the air stream, the boiler combustion air inlet must be piped to an outside location.

Ensure tank return line is not clogged. Obstructions in the line could cause damage to the pump seal.

Regular maintenance of the filter is required (as per the filter manufacturer's recommendations) to maintain the Vantage warranty.

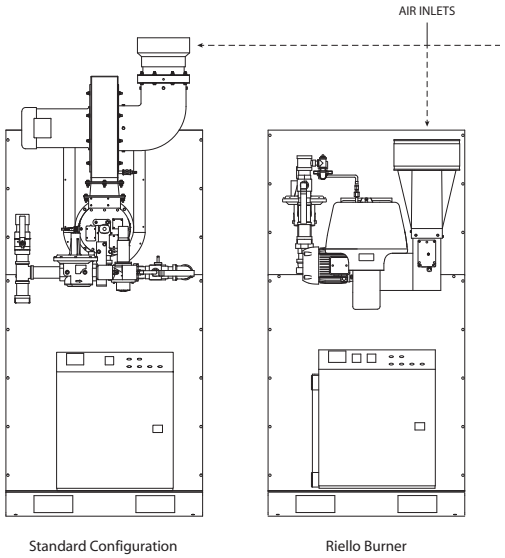

FIGURE 11 - AIR INLET LOCATIONS

Exhaust Venting

The Vantage is equipped with a vent connection (Figure 4) at the lower rear of the boiler.

Adhere to the following for installation:

1. The Vantage is a Category IV appliance, thus venting material must be appropriate for condensing, positive pressure applications. Any venting material supplied for the Vantage boiler must be AL29-4C or 316L SS, listed and labeled to UL1738, and guaranteed appropriate for the application by the manufacturer and supplier of the venting. It is also acceptable to vent the Vantage Cat. II (negative pressure, condensing).
2. The exhaust line must be sloped down toward the drain with a pitch of at least 1/4" per foot. Failure to do so can result in a condensate pocket, which can result in an inoperative boiler. There must be no low spots in the exhaust pipe, as this can also result in a condensate pocket. A high spot is acceptable, provided the pitch from the high spot is maintained back to the boiler or to the outside point of the exhaust. Always avoid rigid connections between piping and structural members of the building.
3. Follow vent manufacturer's instructions for installation of exhaust venting.
4. The condensate connection on the boiler should be piped into the stack drain piping. The pipe from the boiler directed to the drain should be installed at a slope of ¼" per foot.
5. Ensure that the condensate drain piping will not be exposed to temperatures where water/condensate will freeze in the lines.

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■ Common Venting Layouts for Vantage

It is possible to combine the air intake and/or exhaust piping for a number of Vantage boilers. The pressure drop across the common system (combined total for air intake and exhaust) cannot exceed the pressure drop requirements for an individual boiler. See Table 4.

Adhere to the following for installation:

1. Consult your venting supplier for guidance in designing common vented installations. It is imperative to design such systems to prevent backflow of exhaust gases through idle boilers.
2. Vantage boilers cannot be common vented with other equipment.

When designing a draft system for a quantity of two or more Vantage boilers, the following items must be considered and addressed by the parties responsible for designing and providing that system:

▸ MULTIPLE BOILERS SHARING AN EXHAUST STACK, NEGATIVE PRESSURE IN THE COMMON HEADER:

1. Precautions must be taken to ensure that the negative pressure in the common header stays within the stated ranges (refer to table 4) at all possible conditions. This includes considering all possible operating conditions of the stack, including:
   - All boilers on at their maximum input rating capacity
   - One boiler in the system on at a low fire position
   - No boilers on, light off condition
2. Draft accessories, such as stainless steel dampers, may be required depending on the variety of conditions experienced in the draft system.

▸ MULTIPLE BOILERS SHARING AN EXHAUST STACK, POSITIVE PRESSURE IN THE COMMON HEADER:

1. Precautions must be taken to ensure the prevention of flue gases from traveling back through idle boilers (flue gas recirculation, FGR). Looking at the condition of all boilers on at high fire condition will facilitate the selection of the diameter of the stack that is appropriate; however there is still a risk of FGR that needs to be managed. Options to consider for this management include the following:
   - Mechanical draft assist systems (exhaust fans).
   - Stainless steel dampers installed in the individual stack sections prior to the common header connection. Damper must be controlled so that it will close when a boiler is disabled or idle.
   - Other solutions can be considered as long as the precautions to prevent FGR have been thoroughly evaluated.

WARNING

The exhaust vent installer should be familiar with Federal Codes as well as local codes and regulations.

CAUTION

To prevent the possible re-circulation of flue gases, the vent designer must take into consideration such things as prevailing winds, eddy zones, building configurations, etc. It is the responsibility of the installer to locate the exhaust duct in such a way that it does not become blocked due to snow, ice, and other natural or man-made obstructions.

Do not locate the vent termination too close to shrubbery as flue products may stunt their growth or kill them.

WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/ professional codes and regulations.

NOTE: Consider all possible draft conditions (based on the modulation and quantity of the boilers). When doing pressure drop calculations for a system of boilers sharing air intake or exhaust piping, it is important for the designer and provider of the draft system to consider the full scope of possibilities that can be experienced by that system. This includes looking at the condition of one boiler on at a low fire condition and all units on at a high fire condition.

Venting Terminations

Adhere to the following for installation:

1. All vent pipes and fittings must be installed with appropriate air space clearances to combustibles. These air space clearances apply to indoor or outdoor vents—whether they are open, enclosed, horizontal or vertical or pass through floors, walls, roofs, or framed spaces (See Figures 12 and 13). The air space clearances should be observed to joists, studs, sub floors, plywood, drywall or plaster enclosures, insulating sheathing, rafters, roofing, and any other material classed as combustible.
2. The required minimum air space clearances also apply to electrical wires and any kind of building insulation.
3. Adequate provision must be made to support the weight of the exhaust venting. It cannot be supported by the boiler exhaust connection.
4. Listed termination parts must be used.
5. Select the air intake point of penetration where a minimum of 1/4" per foot upward pitch can be maintained.
6. When penetrating a non-combustible wall, the hole through the wall must be large enough to maintain the pitch of the vent and provide sealing. Use adhesive material to seal around the vent on both sides of the wall. When penetrating a combustible wall, a wall thimble must be used. See Figure 13 for installation instructions. Minimum wall thickness through which vent system may be installed is 3.25". Maximum wall thickness through which vent system may be installed is 20 inches.

Wall Thimble Installation

Adhere to the following for installation (see Figure 14):

1. The thimble is inserted through the wall from the outside.
2. Secure the outside flange to the wall with nails or screws, and seal with adhesive material.
3. Install the inside flange to the inside wall, secure with nails or screws, and seal with adhesive material.
4. Pass the vent pipe through the thimble from the outside and join to the rest of the vent system. Seal the pipe to the thimble flange with adhesive material.

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FIGURE 12 - ROOF PENETRATION DETAILS

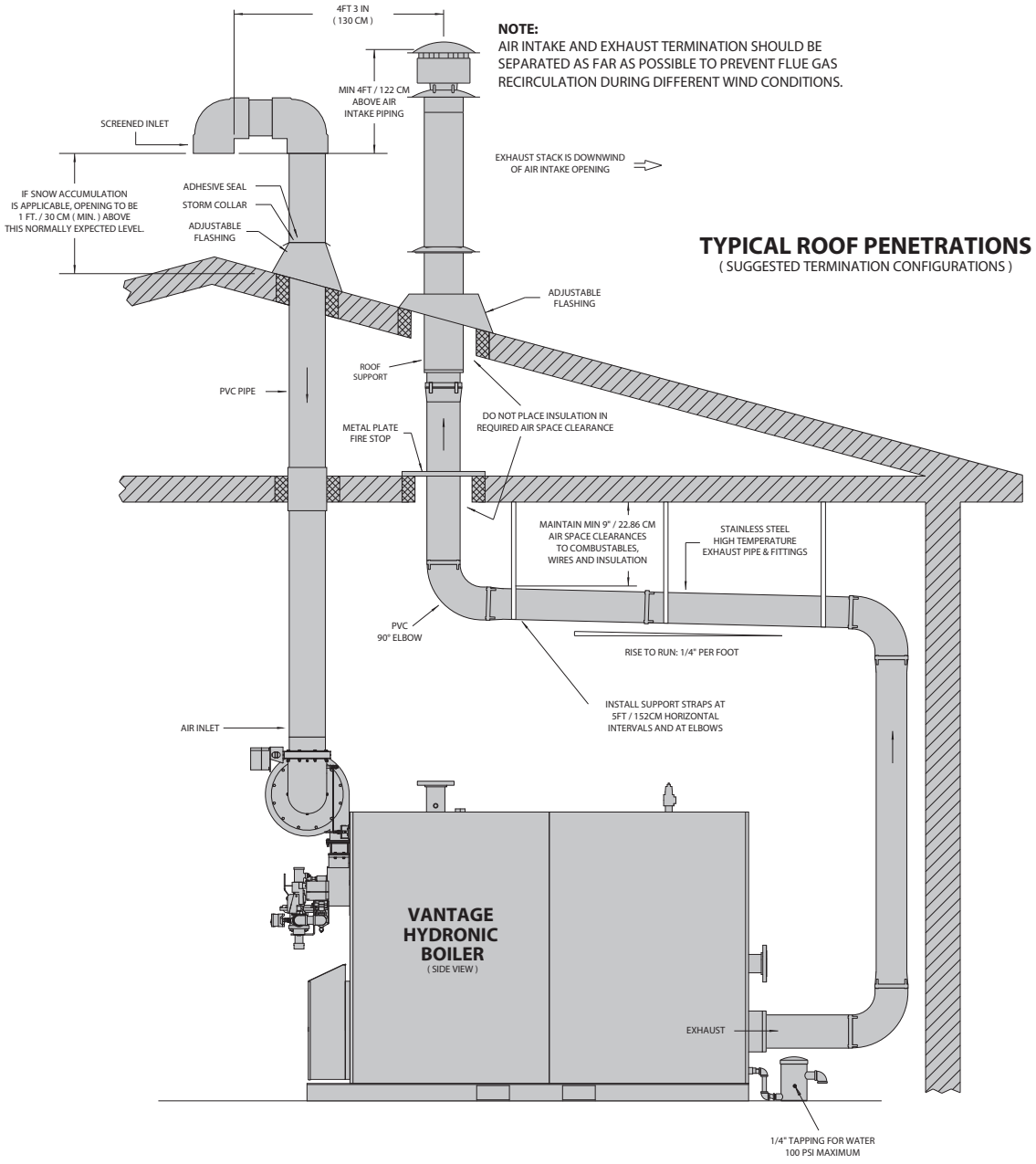
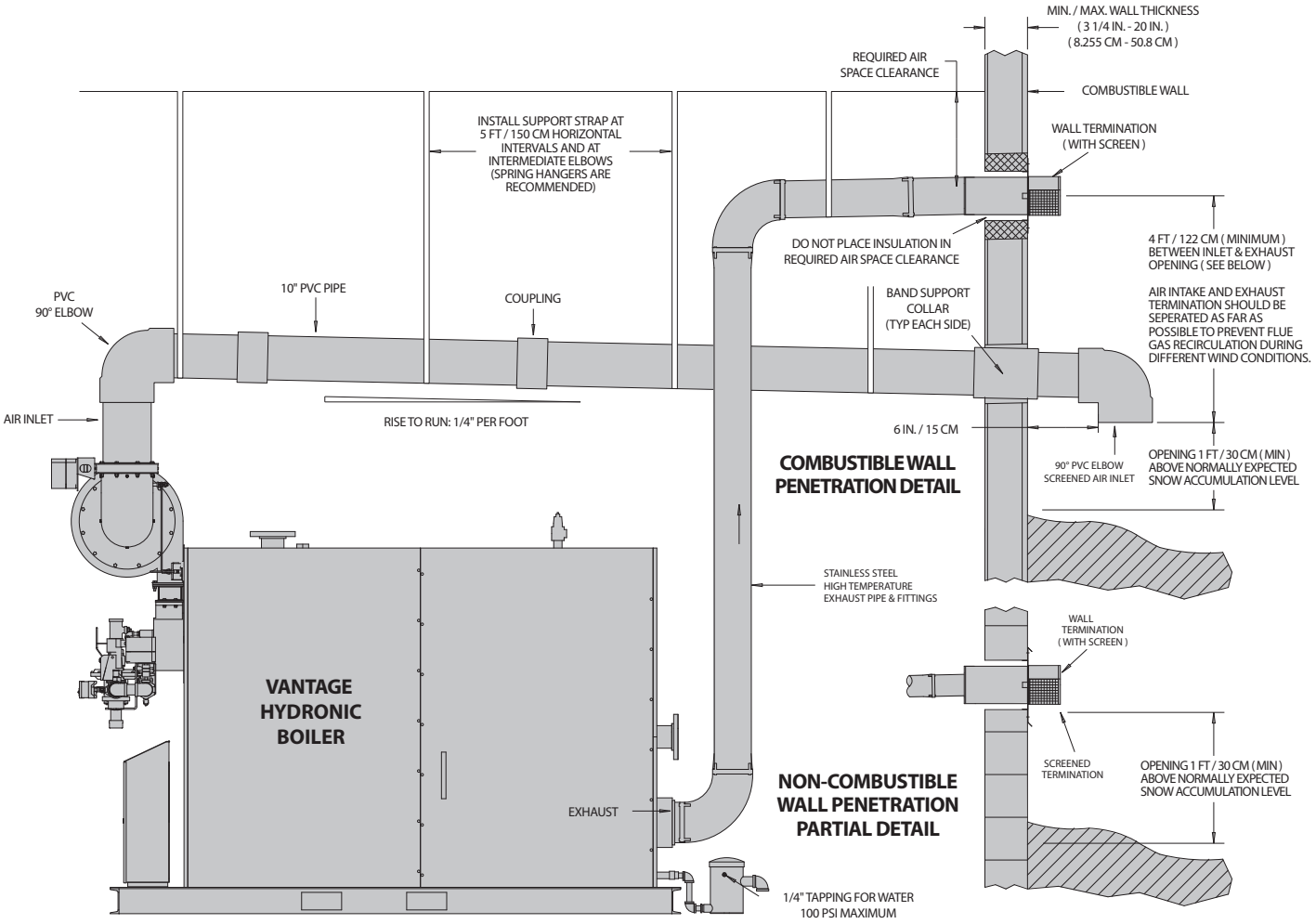
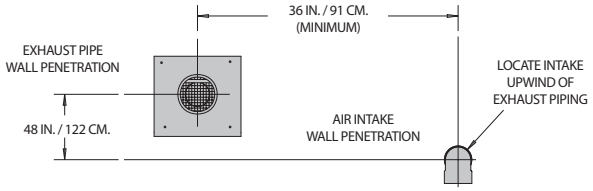

4FT 3 IN
(130 CM)
NOTE:
AIR INTAKE AND EXHAUST TERMINATION SHOULD BE SEPARATED AS FAR AS POSSIBLE TO PREVENT FLUE GAS RECIRCULATION DURING DIFFERENT WIND CONDITIONS.
MIN 4FT / 122 CM ABOVE AIR INTAKE PIPING
SCREENED INLET
EXHAUST STACK IS DOWNWIND OF AIR INTAKE OPENING
IF SNOW ACCUMULATION IS APPLICABLE, OPENING TO BE 1 FT. / 30 CM (MIN.) ABOVE THIS NORMALLY EXPECTED LEVEL.
ADHESIVE SEAL
STORM COLLAR
ADJUSTABLE FLASHING
TYPICAL ROOF PENETRATIONS
(SUGGESTED TERMINATION CONFIGURATIONS)
ADJUSTABLE FLASHING
ROOF SUPPORT
PVC PIPE
METAL PLATE FIRE STOP
DO NOT PLACE INSULATION IN REQUIRED AIR SPACE CLEARANCE
MAINTAIN MIN 9" / 22.86 CM AIR SPACE CLEARANCES TO COMBUSTABLES, WIRES AND INSULATION
STAINLESS STEEL HIGH TEMPERATURE EXHAUST PIPE & FITTINGS
PVC 90° ELBOW
RISE TO RUN: 1/4" PER FOOT
INSTALL SUPPORT STRAPS AT 5FT / 152CM HORIZONTAL INTERVALS AND AT ELBOWS
AIR INLET
VANTAGE HYDRONIC BOILER
(SIDE VIEW)
EXHAUST
1/4" TAPPING FOR WATER 100 PSI MAXIMUM

FIGURE 13 - WALL PENETRATION DETAILS


MIN. / MAX. WALL THICKNESS
(3 1/4 IN. - 20 IN.)
(8.255 CM - 50.8 CM)
REQUIRED AIR SPACE CLEARANCE
COMBUSTIBLE WALL
INSTALL SUPPORT STRAP AT 5 FT / 150 CM HORIZONTAL INTERVALS AND AT INTERMEDIATE ELBOWS (SPRING HANGERS ARE RECOMMENDED)
WALL TERMINATION (WITH SCREEN)
DO NOT PLACE INSULATION IN REQUIRED AIR SPACE CLEARANCE
4 FT / 122 CM (MINIMUM) BETWEEN INLET & EXHAUST OPENING (SEE BELOW)
PVC 90° ELBOW
10" PVC PIPE
COUPLING
BAND SUPPORT COLLAR (TYP EACH SIDE)
AIR INTAKE AND EXHAUST TERMINATION SHOULD BE SEPERATED AS FAR AS POSSIBLE TO PREVENT FLUE GAS RECIRCULATION DURING DIFFERENT WIND CONDITIONS.
AIR INLET
RISE TO RUN: 1/4" PER FOOT
6 IN. / 15 CM
COMBUSTIBLE WALL PENETRATION DETAIL
90° PVC ELBOW SCREENED AIR INLET
OPENING 1 FT / 30 CM (MIN) ABOVE NORMALLY EXPECTED SNOW ACCUMULATION LEVEL
STAINLESS STEEL HIGH TEMPERATURE EXHAUST PIPE & FITTINGS
WALL TERMINATION (WITH SCREEN)
VANTAGE HYDRONIC BOILER
SCREENED TERMINATION
OPENING 1 FT / 30 CM (MIN) ABOVE NORMALLY EXPECTED SNOW ACCUMULATION LEVEL
NON-COMBUSTIBLE WALL PENETRATION PARTIAL DETAIL
EXHAUST
1/4" TAPPING FOR WATER 100 PSI MAXIMUM

AIR INTAKE & EXHAUST PIPES WALL PENETRATION CLEARANCES


36 IN. / 91 CM. (MINIMUM)
EXHAUST PIPE WALL PENETRATION
LOCATE INTAKE UPWIND OF EXHAUST PIPING
48 IN. / 122 CM.
AIR INTAKE WALL PENETRATION

CAUTION:
AIR INTAKE AND EXHAUST TERMINATION SHOULD BE SEPARATED AS FAR AS POSSIBLE TO PREVENT FLUE GAS RECIRCULATION DURING DIFFERENT WIND CONDITIONS

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5. Install two pipe retaining clamps around the intake as well as vent pipes on both ends of the wall thimble (on the inside and outside of the wall) through which intake and vent pipes are passed. They will prevent the intake and vent pipes from being pushed or pulled.

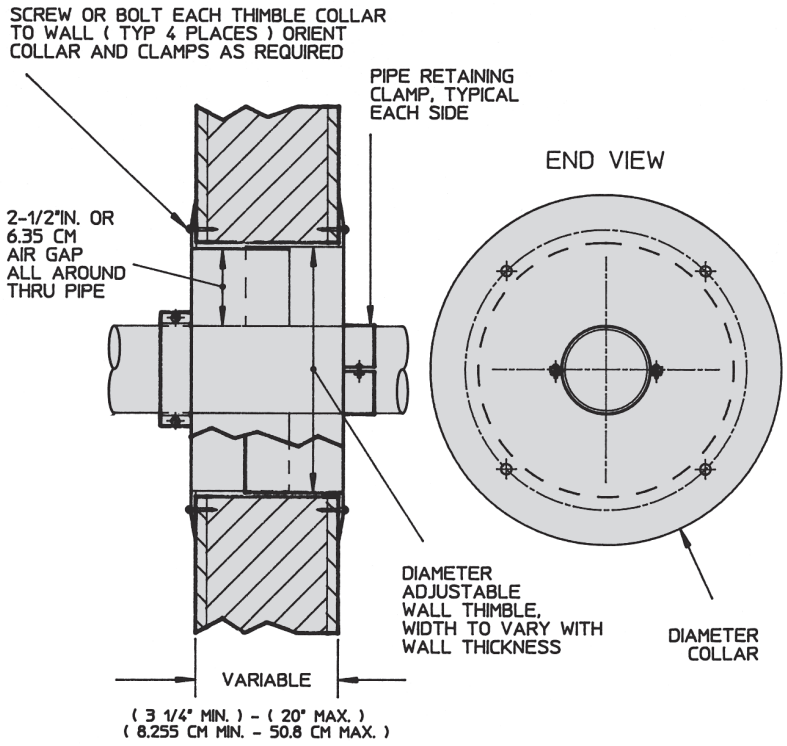
SCREW OR BOLT EACH THIMBLE COLLAR TO WALL (TYP 4 PLACES) ORIENT COLLAR AND CLAMPS AS REQUIRED
PIPE RETAINING CLAMP, TYPICAL EACH SIDE
END VIEW
2-1/2"IN. OR 6.35 CM AIR GAP ALL AROUND THRU PIPE
DIAMETER ADJUSTABLE WALL THIMBLE, WIDTH TO VARY WITH WALL THICKNESS
DIAMETER COLLAR
VARIABLE
(3 1/4" MIN.) - (20" MAX.)
(8.255 CM MIN. - 50.8 CM MAX.)

FIGURE 14 - WALL THIMBLE INSTALLATION

■ Horizontal Vent Termination

Adhere to the following for installation:

➨ *NOTE: The vent termination is joined to the vent pipe outside the wall. Use the same joining procedures for vent pipe and fittings.*

1. The termination of the vent system must be at least 12" above the finished grade, or at least 12" above normal snow accumulation level (for applicable geographical areas).
2. The termination of the vent system shall not be located in traffic areas such as walk ways, adjacent buildings, operable windows and building openings unless the venting system is at least 7 ft (2.1 m) above finished grade, (National Fuel Gas Code, ANSI Z223.1).
3. The vent terminations must be at least 4 ft (1.22 m) horizontally from electric meters, gas meters, regulators, and relief equipment.
4. When installing inlet and exhaust terminations on the same wall, the exhaust outlet must be installed 4 ft (1.22 m) minimum above and

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downwind from air supply inlet to prevent exhaust recirculation.

5. Under certain wind conditions, some building materials may be affected by flue products expelled in close proximity to unprotected surfaces. Sealing or shielding of the exposed surfaces with a corrosion resistant material (such as an aluminum sheet) may be required to prevent staining or deterioration.

6. The minimum vent height should extend at least 3 feet (0.9 m) above the roof, or at least 2 feet (0.6 m) above the highest part of any structure within 10 feet of the vent.

7. If the exhaust vent terminates within 10 ft (3 m) horizontally of the air inlet, the exhaust vent must be at least 4 ft (1.2 m) above the inlet. Dimensions provided are minimum, and may or may not be sufficient for conditions at a specific job site.

8. To prevent the possible re-circulation of flue gases, the vent designer must take into consideration such things as prevailing winds, eddy zones, building configurations, etc. Fulton cannot be held responsible for the effects such adverse conditions may have on the operation of the boilers.

9. It is important to locate the exhaust duct in such a way that it does not become blocked due to snow, ice, and other natural or man-made obstructions.

Removing an Existing Boiler

When an existing boiler is removed from a common venting system, the common venting system is likely to be too large for proper venting of the appliances remaining connected to it.

At the time of removal of an existing boiler, while the other appliances remaining connected to the common venting system are not in operation, the following steps should be followed with each appliance remaining connected to the common venting system placed in operation:

1. Seal any unused openings in the common venting system.

2. Visually inspect the venting system for proper size and horizontal pitch and determine that there is no blockage or restriction, leakage, corrosion or other deficiency, which could cause an unsafe condition.

3. Insofar as is practical, close all building doors and windows and all doors between the space in which the appliances remaining connected to the common venting system are located and other spaces of the building. Turn on clothes dryers and any appliances not connected to the common venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they will operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.

4. Place the appliance being inspected in operation. Follow the lighting instructions. Adjust the thermostat so that the appliance will operate continuously.

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5. Test for spillage at the draft hood relief opening after 5 minutes of main burner operation. Do not use the flame of a match or candle or smoke from a cigarette, cigar or pipe.

6. After it has been determined that each appliance remaining connected to the common venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas-burning appliance to their previous conditions of use.

7. Any improper operation of the common venting system should be corrected so the installation conforms with the National Fuel Gas Code, ANSI Z223.1. When resizing any portion of the common venting system, the common vent system should be resized to approach the minimum size as determined using the appropriate tables.

Electrical Connections

Motors are designed to operate within the following limits at the motor terminals: AC power supplied is within +/- 10% of the motor rated voltage with the rated frequency applied; **or** AC power supplied is within +/- 5% of the rated frequency and with the rated voltage; **or** a combined variation in voltage and frequency of +/-10% (sum of absolute values) of rated values provided the frequency variation does not exceed +/-5% of rated frequency. For 3-phase motors, the line to line full voltage must be balanced within 1% of the rated motor voltage. If the motor is rated 208-230V, the voltage deviations must be calculated from 230V. Operation outside these limits will degrade motor performance. 575V rated motors cannot be operated at voltages above 600V. Depending on motor manufacturer, a 208V rated motor may not be able to run below the design voltage.

Adhere to the following when making electrical connections:

1. Install wiring and ground in boiler in accordance with authority having jurisdiction or in absence of such requirements National Electrical Code, ANSI/NFPA 70.

➨ *NOTE: Connect a ground wire to green colored ground lug in electrical control box.*

2. Review the electrical schematic diagram. Vantage boilers are available with a variety of 3 phase electrical configurations. Step-down transformers are provided as standard with every boiler. Each boiler is shipped with its own unique electrical schematic diagram, a copy of which is located in an envelope on the inside door of the panel box.

3. Connect power to the terminal strip as supplied on the inside of the panel box.

WARNING

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Assembly of Fulton Multi-Skid Systems

Adhere to the following for multi-skid engineered systems:

1. Refer to the Fulton mechanical/electrical drawings during assembly.
2. Ensure that equipment orientation allows for operation interface and maintenance.
3. Align the skids as shown on the drawings ensuring that skid fasteners (skid joint angles) are matched. The skid joint angles are a matched set and the edges of the fasteners should be exactly aligned.

➨ *NOTE: Do not bolt the skids to the housekeeping pad/floor until all of the piping has been reassembled and tightened.*

4. Ensure the skids are level and flat before fastening the skids together with the supplied bolts. The skids should be leveled front to back, side to side and corner to corner. Failure to properly level the skids will result in piping misalignment. A level or laser level should be used to verify skid alignment (when a standard level is used, the length should be appropriate for the skid). If assembling multi-component support stands, attach sections using the supplied bolts through the tank frame mounting plates. These should be hand tight until all of the piping is assembled. Note: skids are leveled at the factory using a laser level.
5. Connect the piping between the skids by matching the union connections and/or flange stamps and tightening. Refer to the mechanical drawing as necessary to confirm location of spool pieces etc. as the flange stamps are shown on the drawing in hexagonal callouts. The flange stamps should matched and aligned (the flange stamps should be directly across from one another. Rotating a flange will result in piping misalignment). Bolts should be hand tight until all of the piping is assembled. Refer to the appropriate instructions to tighten the flanges to the required torque specifications. Support pipe runs as required.
6. Ensure that a low point drain is installed in the piping.
7. Connect the conduit runs between the skids and tighten conduit connectors.
8. Locate the supplied wiring for the equipment and pull wiring through the appropriate conduit runs. Electrical wires are labeled for easy landing. Connect all wiring per the Fulton supplied electrical drawings.
9. If a header is supplied, mount the header as shown in the mechanical drawing.

➨ *NOTE: For piping supplied in sections, make up and connect hand tight until all sections are in place to ensure sections align properly. Sections are match marked for reassembly.*

10. Tighten all connections.
11. Pneumatically test the piping (at 15 psig maximum) prior to filling the systems.
12. Check bolts and connections for tightness after the first heat up cycle. Retorquing may be required.

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INTRODUCTION 1

INSTALLATION 2

OPERATION 3

MAINTENANCE 4

WARRANTY & PARTS 5

WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations. Failure to follow instructions may result in a fire or explosion, causing property damage, personal injury, or loss of life.

This boiler is equipped with an ignition device, which automatically lights the burner. Do not try to light the burner by hand.

Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliances.

Use only your hand to turn the valve handle. Never use tools. If the knob will not turn by hand, don't try to repair it. Call a qualified service technician. FORCE OR ATTEMPTED REPAIR MAY RESULT IN A FIRE OR EXPLOSION.

WHAT TO DO IF YOU SMELL GAS • Do not try to light any appliance. • Do not touch any electrical switch; do not use any phone in your building. • Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions. • If you cannot reach your gas supplier, call the fire department. -A qualified installer, service agency or the gas supplier, must perform installation and service.

Do not use this boiler if any part has been under water. Immediately call a qualified service technician to inspect the boiler and to replace any impacted part of the control system.

Commissioning/Start up by a non-Fulton authorized person will void the product warranty.

Perform Pre-Start-Up Inspection

Prior to start-up, perform the following:

1. Smell all around the boiler area for gas. Be sure to smell next to the floor, as some gas is heavier than air and will settle. If you smell gas:

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone.

2. Ensure the boiler is located with the proper clearances as shown in the **Clearances and Serviceability** section of this manual.
3. Ensure that relief valves have been properly piped to floor drains.
4. Ensure flue gas from the boiler is properly vented.
5. Ensure the water system has been flushed and is free of debris.
6. Ensure combustion air openings are not obstructed in any way and have adequate capacity.
7. Ensure there are no flammable liquids, materials or hazardous fumes present in the environment.
8. Ensure nothing was damaged or knocked loose during installation and/or shipment.
9. Inspect the main gas train and trim assembly to be sure they were not damaged during shipment and/or installation.

Fill and Purge the System

Completely fill and purge the heating system as follows:

1. Close combination shutoff/purge valve in supply, all drain cocks, the shutoff valve for the pressure reducing (fill) valve, and all manual air vents.
2. Open all other system shutoff valves and one of the zone valves, the vent on the combination shutoff / purge valve and the shutoff valve to the pressure-reducing (fill) valve.
3. Water will now begin to fill the system. Air will escape through the vent on the combination shutoff/ purge valve. Continue filling until a constant stream of water (no bubbling) is discharged from the vent.
4. Close the zone valve on the purged loop, and open the zone valve on the next loop to be purged. When all air has escaped and only water is discharged, close the zone valve. When all zones have been purged (one at a time), close the vent on the combination shutoff/purge valve.

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5. At this point, the system has been initially filled. However, air pockets may still remain at high points in the system and in heating loops above the level of the combination shut/off purge valve. It is quite possible, depending on the particular system that all piping above the combination shutoff/purge valve still contains air. If manual vents are installed on the system high points, these should be opened to vent these locations. When only water is discharged from all vents, the initial purging is complete.
6. Open the combination shutoff/ purge valve (keep the vent closed). With the gas shutoff valve closed, turn on power to the boiler and operate the circulator. Circulate the system water for approximately 30 minutes to move all air to the automatic air separation point.
7. Again, open manual air vents at high points of heating loop until a constant stream of water is discharged from the vent. Close the vent and make sure it's watertight. Repeat procedure for all high points and for every zone.
8. Check temperature/pressure indicator reading, which should equal the pressure-reducing (fill) valve set pressure. No more water should be entering the system. Close the shutoff valve on the cold-water fill line.
9. Visually inspect all pipe joints and equipment connections for leaks. If necessary, drain system, repair leaks and refill/purge the system. If no pressure drop is detected for a period of two hours under pressure, the system may be considered watertight.
10. When purging is completed, make sure the following are open—combination shut-off/purge valve, shutoff valve to pressure reducing (fill valve), shutoff valve in cold water fill line, and shutoff valve in return line.
11. Make sure the following are closed - all drain cocks, the vent on the combination shutoff-purge valve, & all manual vents. Reset zone valves to normal mode of operation and turn off power to boiler.
12. Open fuel shutoff valve, allowing fuel to flow to boiler.

Commission The Boiler

Adhere to the following when commissioning the boiler:

1. Verify with authorized personnel that the gas lines have been purged. Do not proceed without verification.
2. Familiarize all personnel on all aspects of boiler use, safety, and contents of this manual. This includes, but is not limited to, the use of the controls, lighting, and shutdown procedures.
3. Review the unit-specific burner and control schematics, and follow appropriate instructions.

■ System Design and Boiler Operation

The Vantage boiler must be installed in an appropriately designed system per

WARNING

Crystalline silica may be present in components of this equipment. Exposure to crystalline silica may pose significant health hazards, including but not limited to eye and respiratory system damage. Per the Centers for Disease Control and Prevention (CDC) and Occupational Safety and Health Administration (OSHA), appropriate personal protective equipment must be worn to minimize exposure to hazardous substances. Refer to most current guidelines offered by the CDC and OSHA for more information, including personal protective equipment recommendations.

Do not attempt to start the boiler for any testing before filling and purging the boiler. A dry fire will seriously damage the boiler and may result in property damage or personnel injury and is not covered by warranty.

Before commissioning the boiler, verify with authorized personnel that the gas lines have been purged.

Never attempt to operate a boiler that has failed to pass all the safety checks.

Never leave an opened manual air vent unattended. In the event an opened vent is left unattended, water damage could occur.

CAUTION

Do not use this equipment if any part has been under water (or subjected to heavy rains/water if the equipment does not have NEMA 4 wiring, controls and instrumentation). Immediately call a qualified service technician to inspect the equipment and to replace any part of the control system and/or gas control(s) which have been under water.

WARNING

Non-Fulton product information is for reference purposes only. No Fulton document should substitute for full review of documentation available from the component manufacturer.

CAUTION

After checking controls by manual adjustment, make sure they are always reset to their proper settings.

Installation section of this manual. The boiler shall be operated/controlled to ensure the boiler does not cycle more than 12,000 times per year and the temperature differential across the boiler does not exceed 100°F (38°C).

Siemens LMV36 and LMV37 Control

NOTE: Operational parameters for the LMV36 are the same as those of the LMV37, however the LMV36 has two load profiles in order to compensate for variations in outdoor air temperature.

Operating Points on the Siemens LMV Control

Every Vantage boiler comes with a Test Fire Report from the factory. This includes nine operating points that are set up in the Siemens LMV control by Fulton's technicians. Parameter 545 needs to be set up specific to job site operating conditions when the boiler is set up and commissioned by a field service technician:

- For Natural Gas/Propane firing, Parameter 545 should be lowered to **20** for units that have a setpoint greater than 100°F (38°C).
- Parameter 545 should be at **30** for units that have a setpoint less than 100°F (38°C).
- If the boiler is operating on an outdoor reset schedule and the setpoint falls below 100°F (38°C) at any time, Parameter 545 should be at **30**.

Normal Operation

The Siemens LMV37 system is a fully packaged burner management system, linkageless control and first out annunciator. When operating the Siemens LMV systems, all changes are made through the Siemens AZL display. The left and right arrow keys are used for scrolling through the menu and changing controller parameters. Enter accepts the menu and parameter changes. It is possible to return to the main menu at any time by repeatedly pressing Escape. When running the boiler, the status of the burner is to be monitored with the Siemens AZL display.

Initial Programming

Perform the following steps once you have completed first-time programming of the Siemens LMV37:

1. Press and hold the F and A buttons simultaneously. You will be prompted for your password. The National Board Number of the boiler is the service password.
2. Enter your password and press the enter button.
3. Using the – button, scroll to parameter level 100.
4. To enter into a parameter level and start programming, press the enter button.

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5. Use the - button to scroll through the parameters.
6. Press the enter button to enter the parameter. The current value will start flashing.
7. Use the – button to decrease the value or + button to increase the value.
8. Once the desired value has been set, press the enter button. The number will stop flashing.
9. Press the – and + buttons together to back out of the parameter level when finished.
10. Press the – or + buttons to scroll to the next section of the program.
11. Repeat this process until all parameters have been reviewed and set.
12. Once the parameters have been programmed, back out to the front screen by pressing the – and + buttons together.

■ Commissioning the Unit

Perform the following steps for commissioning the unit with the Siemens LMV37:

➨ *NOTE: A combustion analyzer will be needed when performing changes to the profile.*

1. Press and hold the F and A buttons simultaneously. You be prompted for your password.
2. Enter your password and press the enter button.
3. Using the – button scroll to parameter level 400. Press the enter button. RUN will appear. Press the enter button again.
4. Turn the heater on and make sure that there is a call for heat. PH12 means the unit is in standby and is looking for a call for heat to start. The unit should start to Pre-purge (PH22) and drive to 100% purge (PH24), then begin purge countdown in PH30.
5. Once the control has reached the Ignition position (PH36), press the + button. This will allow the heater to light.
6. You will be at P0. P0 is the start of the profile and the Ignition position.
7. Make changes to the fuel profile. Two changes will need to be made: fan output and fuel settings. Increasing or decreasing the fan output will primarily increase or decrease the input to the unit. Making fuel valve changes will primarily affect the fuel-air ratio, and will have some small effect on the input to the unit.
8. To make changes: Drive the unit to the high-fire position, P9. Check the O2 level in the stack.

WARNING

Non-Fulton product information is for reference purposes only. No Fulton document should substitute for full review of documentation available from the component manufacturer.

CAUTION

When making changes to the controls profile, a combustion analyzer is required.

WARNING

Non-Fulton product information is for reference purposes only. No Fulton document should substitute for full review of documentation available from the component manufacturer.

This boiler is equipped with an ignition device which automatically lights the burner. Do not try to light burner by hand.

CAUTION

Do NOT leave unit unattended in Manual Operation, in this mode the LMV51 will ignore its internal Set Point.

Siemens LMV51 Control

■ Operating Points on the Siemens LMV Control

Every Vantage boiler comes with a Test Fire Report from the factory. This includes nine operating points that are set up in the Siemens LMV control by Fulton's technicians. Point #1 needs to be set up specific to job site operating conditions when the boiler is set up and commissioned by a field service technician:

- For Natural Gas/Propane firing, Parameter MinLoad should be at **0** for units that have a setpoint greater than 100°F (38°C).
- Parameter MinLoad should be at **20** for units with a setpoint less than 100°F (38°C).
- If the boiler is operating on an outdoor reset schedule and the setpoint falls below 100 F (38°C) at any time, Parameter MinLoad should be at **20**.

■ Normal Operation

The Siemens LMV51 system is a fully packaged burner management system, linkageless control and first out annunciator. When operating the Siemens LMV systems, all changes are made through the Siemens AZL display. The left and right arrow keys are used for scrolling through the menu and changing controller parameters. Enter accepts the menu and parameter changes. It is possible to return to the main menu at any time by repeatedly pressing Escape. When running the boiler, the status of the burner is to be monitored with the Siemens AZL display. If at any time the burner control locks out on a fault condition and the red flame failure light illuminates:

1. Read the diagnostic feedback on the AZL display, address the fault if possible.
2. Press escape on the AZL once.
3. Press enter on the AZL to reset the control. The red light should go out.
4. If the fault persists contact Fulton.

If the boiler has a dual fuel burner, the burner setup procedures must be performed for each fuel.

■ Pre-Ignition

Perform the following prior to ignition:

1. Verify the main burner position switch is in the OFF position. If the boiler is dual fuel, verify the fuel selector switch is turned to the correct fuel position.
2. Supply power to the boiler. The AZL will display "System Test" and then move to the main menu.
3. Select PWLogin, press Enter. Select AccessServ. Press Enter. This type of

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step will be shown as PWLogin > AccessServ for the remainder of this section.

4. Enter the service passwords using the arrow key. The password is case sensitive. The case of a letter can be changed by pressing the other arrow key. (For example, if you used the right arrow key to get the letter A, press the left arrow key to get a. After you have pressed Enter on the last character of the password, press Enter on the last character of the password, press Enter once more to accept the password. If you do not have the password, contact your Fulton Authorized Representative to perform the changes.
5. Select Params&Display. Press Enter. Select RatioControl. Press Enter. Select ProgramStop. Press Enter. Change the Program Stop to 44 Interv1 by using the arrow keys. Confirm the change by pressing Enter. This will set the burner management system to a 'pilot hold' setting.
6. Verify that the current valve "curr" changes to 44 Interv 1. The full list of program stops are:
    - » 24-Air damper in the pre-purge position
    - » 36-Ignition position (before pilot ignition)
    - » 52-Ignition position (after main burner ignition)
    - » 72-Air damper in the post-purge position
7. Press Escape four times to get back to the main menu.
8. Under ManualOperation > Setload, change the load to 0% by using the arrow keys. Press enter and verify the 0% has been acknowledged in the "curr" field.
9. Press escape once to get back to the ManualOperation menu.
10. Under Auto/Manual/Off, change the operation to Burner On by using the arrow keys. Press enter and verify that "Burner On" is acknowledged in the current field.
11. Press Escape twice to get back to the main menu.
12. Increase the setpoint on the temperature controller to create a heat demand.
13. Turn the main burner switch to the Local or On position.
14. After several seconds the burner control will start its pre-ignition phase and the blower will start. You can observe the status of the burner by going to the main menu (by pressing Escape) then selecting OperationalStat > NormalOperation.

■ Setting Pilot (For Boilers Equipped With a Pilot)

1. Following the Pre-Ignition phase (see previous section), the unit will purge then drive to the ignition position and ignite. The burner control will stay at this pilot hold stage so you can inspect and adjust the pilot as needed.

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2. Ensure the pilot gas pressure matches the test fire sheet.
3. View the top menu of the Siemens AZL Display to ensure the flame signal is greater than 90%.
4. Once the pilot is adjusted properly and you are ready to light the main burner, press Escape to the main menu.

■ Setting Main Burner Ignition

1. Under Params&Display > RatioControl > ProgramStop, change the ProgramStop to 52 Interv2. This is the main burner ignition position. Press Enter and confirm that 52 Interv2 is acknowledged in the current field. This change moves the control to the main burner ignition point in the burner sequence.
2. This will allow the main burner to ignite. Should the burner not light, the fuel and air servo motors may not be synchronized to produce a combustible mix.
3. Turn the ON/OFF switch on the panel box to OFF.
4. Switch the ON/OFF switch back to ON. The heater will re-start.

➨ *NOTE: The light off point for main flame can be set at a higher input than low fire.*

5. Press Escape six times to get back to the main menu.
6. Observe the status of the burner by going to OperationalStat > NormalOperation.
7. Verify that the flame signal on the display is greater than 90% and check combustion. Adjust the burner to match the test fire sheet for main burner ignition.
8. Once the ignition position has been adjusted properly, you are ready to check the burner throughout its modulation range. Press Escape twice to get back to the main menu.

■ Resetting the Alarm

1. Press Escape on the AZL once.
2. Press Enter on the AZL to reset the control. The red light should go out.
3. ***To change the settings***:
   - » Return to the front menu by pressing Escape until you are to the main menu.
   - » Select Params&Display > RatioControl > GasSettings (Or OilSettings, depending on the selected fuel) > SpecialPositions > IgnitionPos, adjust the fuel servo position by using the arrow key to move down to fuel servo if needed.
   - » Press Enter to select the servo. Move the fuel servo to its new

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position with the arrow keys.

» Press Enter to confirm the new value.

» Use the down arrow to move the air servo setting if needed. Press Enter to select the servo, use the arrow keys to set the new value. Press Enter to confirm this.

■ Setting Modulation

Before releasing the boiler to modulation, the boiler will drive to low fire. It is necessary to set combustion through the entire range of modulation first to enable high fire to be reached. Once high fire is achieved, the incoming gas pressure can be set. Fine tuning of the servo setting throughout the range should be performed only once high fire settings are confirmed.

Proceed as follows:

1. Under Params&Display > RatioControl > ProgramStop, change the program stop to deactivated by using the arrow keys. Confirm that 'deactivated' is acknowledged in the current field.
2. This change will allow the burner to modulate. The burner will now drive to low fire. Remember, it is only important at this stage to set low fire to be stable and with clean combustion. Exact setting is to be performed once high fire is confirmed.
3. Press Escape five times to get back to the main menu.
4. Observe the status of the burner by going to OperationalStat > NormalOperation.
5. Verify the flame signal on the display, measure input if fuel meter is available. If not match last elbow pressures and combustion from test fire sheet. Adjust the burner as needed. To adjust the servo position, refer to **Setting Low Fire** section.

■ Setting Low Fire

➨ *NOTE: As soon as a servo position is altered, the servo will move to that position. Only change servo settings by a maximum of 0.5 degrees at a time before verifying combustion.*

Proceed as follows:

1. Go to Params&Display > RatioControl > GasSettings (or OilSettings depending on fuel) > CurveParams.
2. Wait for the spinning line on the left to disappear. Press Enter. The number 1 should appear to the right of the cursor, this is the Point Number.
3. Press Enter once. Select ChangePoint by pressing the arrow keys to highlight and then press Enter to select. This will cause the servo motors to move to this low fire point.

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4. Check combustion and adjust the servo motors are required. To adjust a servo motor, arrow to it and press Enter. Then adjust the setting as required and press Enter. You can now adjust another servo motor if needed.

5. When combustion is properly set of that point, press Escape once more. If it asks you to store the point, press Enter. Note the AZL will only ask to save if either servo value has been altered. Low fire is now set and stored.

■ Setting the Complete Turndown Range

➨ *NOTE: It is only necessary to approximate the setting through the modulation range until high fire conditions are established.*

Proceed as follows:

1. Press Enter to have access to the point number field. Increase the point number by one and press Enter.

2. Select ChangePoint and press Enter. The servos will now move to that point.

3. Verify combustion is satisfactory.

4. Measure input or monitor last elbow pressure. Verify that these points are in general correspondence with the test fire sheet.

5. Repeat above until the point position has a load value of 100%. You are now at high fire. Verify combustion is per test fire sheet.

6. ***If operating on gas,*** adjust the incoming gas pressure at the main gas regulator to match the test fire report. Adjust the gas servo motor to change the last elbow pressure to match the test fire report. Adjust the air servo motor to adjust the emissions as needed.

7. ***If operating on oil***, adjust the oil pump and air pressure regulator to match the pressures on the test fire sheet. Adjust the oil servo until the oil flow rate matches the test fire sheet. Adjust the air servo to match the test fire sheet.

8. Repeat the procedure for setting low fire but start at the high fire point number. Continually decrease the point number after combustion has been verified at each point.

If the burner loses flame while driving to a point:

- » Turn the main ON/OFF switch to OFF. Reset the loss of flame fault by depressing (for 3 seconds) the Flame Safeguard Reset pushbutton. The red light on the panel box door should go out.
- » Adjust the air and gas servos for that point while the burner is off.
- » Turn the main ON/OFF switch to ON.

9. Once all the points have been verified, press Escape until you are back to the main menu.

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10. Observe the status of the burner by going to OperationalStat > NormalOperation.
11. Turn the main ON/OFF switch to OFF. The control will now post purge.
12. Follow the Pre-Ignition steps again to verify ignition with the new gas pressures.
13. Turn the main burner switch to OFF. The control will now post purge.
14. Change the operation to Automatic under ManualOperation > Auto/Manual/Off and press Enter and confirm Automatic is entered in the current field.
15. Press Escape four times. Select PW Logout, the password is now logged out.
16. Press Escape twice. Select OperationalStat > NormalOperation. The control is now on the normal operational display screen.
17. The boiler is now ready to run. Adjust your setpoint on the temperature control to the desired temperature and turn the main ON/OFF switch to ON for the burner to operate.

Operating Temperatures and Fuel Selection

Use Table 6 to determine minimum return water temperature requirements:

TABLE 6 - MINIMUM RETURN WATER TEMPERATURES

Fuel	Minimum Return Water Temperature
Natural Gas	No minimum return water temperature
Propane	No minimum return water temperature
#2 Fuel Oil	140°F (60°C)
B100 Bio-Diesel	100°F (38°C)
#2 Fuel Oil with guaranteed <15 ppm Sulphur	100°F (38°C)
Digester Gas/Alternative Fuels	Consult Factory

Temperature Controller Instructions

The Siemens LMV37 and LMV51 controls may be paired with a temperature controller. Options include the SC-500 Temperature Controller, the Yokogawa UT 32A, and the Siemens RWF40.

■ SC-500 Temperature Controller Basic Programming

▶ CHANGE SET POINT

1. Set Point Mode is accessed through the switch selection or BMS screen selection.

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CAUTION

The minimum return water temperature to the boiler is 140°F (60°C) when firing on oil. Failure to maintain this will void the warranty.

Unburned oil, unlike gas, does not leave the combustion chamber during purge.

*A temperature exceeding 120°F** in the boiler room may cause premature failure of electrical components. Provisions should be made to maintain an ambient temperature of 120°F** or less (the panel box interior should not exceed 125°F**).*

*****Pumps, PLC or ModSync panels may require lower ambient temperatures or additional cooling.***

- Min. Loop Temp: Minimum setpoint temperature at which the boiler can operate.
- Max. Loop Temp: Maximum setpoint temperature at which the boiler can operate.
- SC-500 Setpoint: Boiler setpoint when SC-500 setpoint mode is selected.

SET BOILER ON TEMPERATURE

1. From Main Menu screen, select System Config.
2. Select Sensor Config and set.

SET PROPORTIONAL BAND, INTEGRAL AND DERIVATIVE VALUES

The Proportional Band, Integral, and Derivative Values are accessed via the PID Configuration Screen.

- Proportional Band: This is the percentage of change in proportion to the difference between setpoint (SP) and process output (PV).
- Integral: The integral is a variable time period used to adjust an output.
- Derivative: This variable allows the anticipation of whether the PV will overshoot the SP, and reduces the output as needed.
- Manual Reset: This value will offset the PID.

Yokogawa UT 32A Basic Programming:

CHANGE SET POINT

1. SP (set point) display reads current set point in degrees F.
2. Use arrow keys on main screen to change SP to desired value. Press SET/ENT to enter value.

SET BOILER ON TEMPERATURE

1. Push and hold SET/ENT button for 3 seconds. Display will read oP.PA.
2. Push SET/ENT button. A1 will be displayed.
3. Enter value of subtractive differential i.e. SP - A1= Heater On Temperature. Ex. SP = 200, A1 = 5 Heater will turn on at 195 F. (Note: subtracting a negative value yields a positive number. Ex. SP = 200, A1 = -5, Heater will turn on at 205 F.
4. Push and hold SET/ENT button for 3 seconds. Display will return to default.

SET BOILER OFF TEMPERATURE

1. Push and hold SET/ENT button for 3 seconds. Display will read oP.PA.
2. Use down arrow key to scroll to St.UP.

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3. Push SET/ENT button. FU.nC will be displayed.
4. Push SET/ENT button. AL1 will be displayed.
5. Use SET/ENT button to scroll to HY1.
6. Enter value of hysteresis (difference between on and off). This value will be added to SP - A1 value to determine Heater Off Temperature. I.e. SP - A1 + HY1 = Heater Off Temperature. Ex. SP = 200, A1 = 5, HY1 = 20 ☒ Heater will turn on at 195 F and will turn off at 200 - 5 + 20 or 215 F.
7. Push and hold SET/ENT button for 3 seconds. Display will return to default.

▸ SET PROPORTIONAL BAND, INTEGRAL AND DERIVATIVE VALUES

Proceed as follows:

1. Push and hold SET/ENT button for 3 seconds. Display will read oP.PA.
2. Use SET/ENT button to scroll to PID.
3. Use the arrow key to change value from 0 to 1. Press SET/ENT to enter value.
4. Push SET/ENT button. 1.P will be displayed. The higher this number is, the sooner the heater will begin to drop to low fire. The smaller this number is, the longer the heater will remain at high fire before dropping to low fire. Press SET/ENT to enter value.
5. Push SET/ENT button. 1.I will be displayed. The smaller this number is, the quicker the heater will anticipate and react to changes in temperature. Press SET/ENT to enter value.
6. Push SET/ENT button. 1.d will be displayed. This value must be ¼ the value in 1.d. Press SET/ENT to enter value.
7. Push and hold SET/ENT button for 3 seconds. Display will return to default

■ Siemens RWF40 Basic Programming

▸ CHANGE SET POINT

Proceed as follows:

➨ *NOTE: The green number on the default display reads current set point in degrees F.*

1. Press and hold the PGM button for 3 seconds. A number in red and the letters AL in green will appear.
2. Use PGM button to scroll down to SP1.
3. Use the arrow buttons to change SP1 to the value desired. Press the PGM button to enter value.
4. Press the EXIT button to return to default display.

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SET BOILER ON TEMPERATURE

1. Press and hold the PGM button for 3 seconds. A number in red and the letters AL in green will appear.
2. Use PGM button to scroll down to HYS.1.
3. Use the arrow buttons to change HYS.1 to the value desired. This value is a subtractive differential from set point at which the burner will be turned on. I.e. SP1 – HYS.1 = Heater On Temperature. Ex. SP1 = 160, HYS.1 = 5 Heater will turn on at 155 F. Press the PGM button to enter value.
4. Press the EXIT button to return to default display.

SET BOILER OFF TEMPERATURE

1. Press and hold the PGM button for 3 seconds. A number in red and the letters AL in green will appear.
2. Use PGM button to scroll down to HYS.3.
3. Use the arrow buttons to change HYS.3 to the value desired. This value is a additive differential from set point at which the burner will be turned on. I.e. SP1 + HYS.3 = Heater Off Temperature. Ex. SP1 = 160, HYS.3 = 5 Heater will turn off at 165 F. Press the PGM button to enter value.
4. Press the EXIT button to return to default display.

SET PROPORTIONAL BAND, INTEGRAL AND DERIVATIVE VALUES

1. Press and hold the PGM button for 3 seconds. A number in red and the letters AL in green will appear.
2. Use the PGM button to scroll down to Pb1.
3. Use the arrow keys to change Pb1 to the value desired. The higher this number is, the sooner the heater will begin to drop to low fire. The smaller this number is, the longer the heater will remain at high fire before dropping to low fire. Press the PGM to enter value.
4. Use the PGM button to scroll down to dt.
5. Use the arrow keys to change dt to the desired value. This value must be ¼ the value in rt. The smaller this number is, the quicker the heater will anticipate and react to changes in temperature. Press the PGM button to enter value.
6. Use the PGM button to scroll down to rt.
7. Use the arrow keys to change rt to the desired value. The smaller this number is, the quicker the heater will anticipate and react to changes in temperature. Press the PGM button to enter value.
8. Press the EXIT button to return to default display.

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Access to Variable Speed Drive Blower Motor

(Models VTG-3000LE, VTG-4000LE)

➨ *NOTE: Some Fulton Vantage Low Emissions Designs include a Variable Frequency Drive (VFD). The VFD is a Telemechanique Altivar 21 style.*

The Variable Speed Drive programs are password protected and should only be accessed by factory-trained personnel. Please contact your authorized Fulton representative for assistance.

■ Test of Ignition Safety System

Test the ignition system safety shutoff as follows:

1. Remove the black plug/connector from the main gas valve (it is held on with a central screw).
2. With the main gas cock (inlet manual gas valve) open, the burner should be cycled on. After all the safety limits such as gas pressure, water flow and temperature are satisfied, the blower will run and pre-purge the boiler.
3. Once the purge is complete (30 seconds), the ignition transformer will be energized. There will be a 4 second trial for ignition period. During this period, indicator lights on the flame safeguard (pilot and main)
4. The main gas valve will not open because there is no power to the valve due to the disconnected wires. Hence, no flame will be established and the flame safeguard will not receive a flame signal from the UV scanner.
5. After 4 seconds, the flame safeguard programmer will assume a "Flame Failure" condition and go to a "lockout" mode. Lockout will require manual reset of the flame safeguard.
6. After completing this test, turn off the boiler and reconnect the wires to the main gas valve.

Perform Test of Low Water Cut Off

Once the boiler is full of water the following test can be accomplished:

1. Turn the boiler on, this will start the Call for Heat sequence.
2. Press and hold the Low Water Test button for 3 seconds. The Low Water light should illuminate and the boiler should shut down the Call for Heat sequence.
3. Reset the Low Water condition by pressing the Low Water reset button and the LMV Reset button. Boiler should start the Call for Heat sequence again.
4. Perform appropriate test for any secondary Low Water controls.

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Operating this equipment beyond its design limits can damage the equipment and can be dangerous. Do not operate the equipment outside of its limits. Do not try to upgrade the equipment performance through unapproved modifications. Unapproved modifications may cause injury, equipment damage, and will void the warranty.

WARNING

Do not operate, or allow others to operate, service or repair this equipment unless you (they) fully understand all applicable sections of this manual and are qualified to operate/maintain the equipment.

Check daily that the equipment area is free and clear of any combustible materials, including flammable vapors and liquids.

CAUTION

For all systems containing boilers or unfired steam generators, the water chemistry in the boiler (generator) must be kept within required limits. Failure to do so may cause premature pressure vessel failure and poor steam quality and will void the warranty.

Perform Test of Limit Controls

Fire the boiler and test the high limit control as follows:

1. Alter high temperature limit to a value lower than the anticipated loop temperature. Turn the boiler on. Water temperature will rise until the boiler locks out. This condition has to be manually reset.
2. Alter the high limit cut off temperature to normal level, typically 10-20 degrees above set point.

Perform Test of Low Gas Pressure Switch

Test the low gas pressure switch as follows:

1. With the boiler running turn down the low gas pressure switch until a lock out is annunciated.
2. Reset the switch to normal level, re-start the boiler.

Perform Test of High Gas Pressure Switch

Test the high gas pressure switch as follows:

1. Close the downstream main gas cock and start the boiler.
2. Once the trial for ignition period is reached, the main gas valve will open, pressurizing the line. This will trip the high gas pressure switch.
3. Manually reset the high gas pressure switch after it trips.

General Operation of the Boiler

Excessive cycling will reduce the useful life of any piece of mechanical equipment. Vantage boilers should be operated and controlled so the boiler cycles less than 12,000 times per year. Vantage boilers should be operated and controlled so that the temperature differential across the boiler does not exceed 100°F (38°C).

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INTRODUCTION 1

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OPERATION 3

MAINTENANCE 4

WARRANTY & PARTS 5

WARNING

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Prior to any maintenance concerning electrical components of this equipment, ensure electrical supply to the equipment is disconnected. Label all wires prior to disconnection; wiring errors may cause improper and hazardous operation.

Follow all proper lockout/tagout procedures for service.

Before beginning any maintenance, ensure area is free of any combustible materials and other dangers.

What to do if you smell gas:
Do not try to light the appliance.
Do not touch any electrical switch.
Do not use any phone in the building.
Leave building and contact gas supplier from neighbor's phone. If you cannot reach gas supplier, phone the fire department.

After initial start-up by qualified personnel, linkage, control settings, and fuel pressures should not be readjusted.

CAUTION

All maintenance procedures should be completed by trained personnel. Appropriate training and instructions are available from the Fulton Service Department at (315) 298-5121 or your local Fulton Heating Solutions Representative.

In order to meet warranty conditions, ensure all appropriate maintenance activities are performed.

General

Your Vantage boiler has been designed to provide years of trouble free performance. To ensure continued safety and efficiency of the boiler, please follow the maintenance and inspection directions outlined in this section of the manual.

Daily, Weekly and Monthly Maintenance and Inspection (Fulton considers the following to be good practice for any boiler, and is applicable to the full line of Vantage boilers). It is also good practice for any boiler installation to perform a thorough review of the overall system on a regular basis, and after any maintenance procedures. Any potential issues should be noted and followed up on to ensure safety and reliability of all relevant equipment. System review items may include:

- Looking for discoloration of any painted equipment, boiler jacket panels, and/or insulation used in system piping
- Looking for evidence of leaks including the air intake/exhaust systems, boilers, hydronic system piping, pumps, valves and other system components
- Once boilers are running, making sure there are no flue gases around the boilers, or in the boiler room

Daily Maintenance and Inspection Schedule

Daily maintenance and inspection must include the following:

1. Observe operating temperature and general conditions.
2. Make sure that the flow of combustion and ventilating air to the boiler is not obstructed.
3. Boiler area is free and clear of any combustible materials, including flammable vapors and liquids.

Weekly Maintenance and Inspection Schedule

Weekly maintenance and inspection must include the following:

1. Observe the conditions of the main flame. Correct air adjustment is essential for the efficient operation of this boiler. If an adjustment to the combustion is necessary, the flue gas composition should be checked with a carbon dioxide (CO2) or oxygen (O2) analyzer to set conditions.

Monthly Maintenance and Inspection Schedule

Monthly maintenance and inspection must include the following:

1. Test high-limit control by reducing setting below the operating temperature. Burner should shut off. After readjusting the thermostat, press the button to reset the switch.

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2. Test operating temperature control by reducing temperature setting as necessary to check burner operation.
3. Check flue gas temperature at outlet. If there is a temperature increase over previous readings, the probable cause is soot or water-scale build-up on the tubes. Consult Fulton Heating Solutions immediately if there is a concern.
4. Test low gas pressure switch and high gas pressure switch utilizing the procedure in operation section.
5. For Low Emissions model boilers, inspect the air inlet filter. If any dust, lint or debris has accumulated, clean or replace the filter.

Procedure for Cleaning the Air Inlet Filter (Low Emissions Burners)

Proceed as follows:

1. Remove the filter. The filter sits in a custom slot on the air inlet connection to the boiler.
2. Remove all debris and dirt from the filter using a non-corrosive soap and water. If debris is not readily removeable from the filter, replace the filter. It is imperative that the same type/style/size filter is used (available from Fulton).
3. Return the filter to its original position in the slot.

Annual Maintenance and Inspection Schedule

Annual maintenance and inspection must be performed prior to each heating season, and includes but is not limited to the following tasks, which must be done by a factory trained technician:

1. Inspect the fuel train, burner and control panel to be sure components are free of debris and are properly attached to the boiler.

➨ *NOTE: There is no need to disassemble the fuel train, burner or control panel unless the technician suspects damage or malfunction.*

2. Examine the venting system (air intake and exhaust piping).
    - Check all joints and pipe connections for tightness.
    - Check piping for corrosion or deterioration.
    - Check that the piping is clear of debris.
    - Check that the condensate drain system is functioning.
3. Inspect the hydronic heating system for other problems.
4. Perform combustion analysis and adjust if necessary.

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Crystalline silica may be present in components of this equipment. Exposure to crystalline silica may pose significant health hazards, including but not limited to eye and respiratory system damage. Per the Centers for Disease Control and Prevention (CDC) and Occupational Safety and Health Administration (OSHA), appropriate personal protective equipment must be worn to minimize exposure to hazardous substances. Refer to most current guidelines offered by the CDC and OSHA for more information, including personal protective equipment recommendations.

Never use open flame or other sources of ignition to check for gas leaks.

CAUTION

Use caution when using any cleaning solutions. Refer to local regulations for proper cleaning solution disposal.

Do not allow oil leaks, dust, or dirt to accumulate around the boiler.

CAUTION

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All maintenance procedures should be completed by trained personnel. Appropriate training and instructions are available from the Fulton Service Department at (315) 298-5121 or your local Fulton Heating Solutions Representative.

In order to meet warranty conditions, ensure all appropriate maintenance activities are performed.

5. Leak test the gas valves.
6. Test relief valve per manufacturer instructions by lifting the lever for 5 seconds and allowing the valve to snap shut. Please see the manufacturer's recommendations on the relief valve tag.

Verification of Torque Settings on Fireside Access Doors

➨ *NOTE: This section is relevant to Models VTG-4000LE, VTG-4000DF, VTG-5000DF, and all standard VTG-4000 and VTG-5000 units starting with National Board # 7618 or shipped after June 14, 2012.*

There are two access doors to the fireside of the heat exchanger of the above referenced Vantage models. There are a series of bolts on each door that must be checked for torque every 2,500 operating hours, or once per heating season (whichever is more frequent).

Proceed as follows:

1. Remove the boiler jacket panels (upper and lower) on the front of the boiler.
2. Verify settings of the upper door. The upper door is retained by (4) 1-1/8" bolts. Tools required for upper door setting verification:
    - 1-13/16" socket and ¾ x ½" adapter (these were provided from the factory and should be stored in a safe place in the boiler room). If these components have been misplaced, please contact Fulton to purchase replacement components. The Fulton part numbers are 2-22-000570 (socket) and 2-22-000571 (adapter).
    - ½" drive torque wrench and extension (provided by service technician)

➨ *NOTE: The upper door has a mass of approximately 140 lbs. Do not remove the (4) bolts or door without guidance from the factory with regards to proper procedures for accessing the fireside of the heat exchanger.*

3. Evenly tighten all 4 bolts on the upper door in three stages: first to 20 ft/lbs, then to 35 ft/lbs, then to 50 ft/lbs in the following criss-cross pattern: top left, bottom right, bottom left, top right. Recheck all bolts in a circular pattern. See Figure 15.
4. Verify settings of the lower door. The lower door is retained by (16) 9/16" bolts. Tools required for lower door setting verification:
    - 9/16" socket and 3/8" drive wrench (provided by service technician)
5. Evenly tighten all 16 bolts on the lower door to 23 ft/lbs in a criss-cross pattern. See Figure 15. Do not over torque, as this can result in damaging of the door seal.

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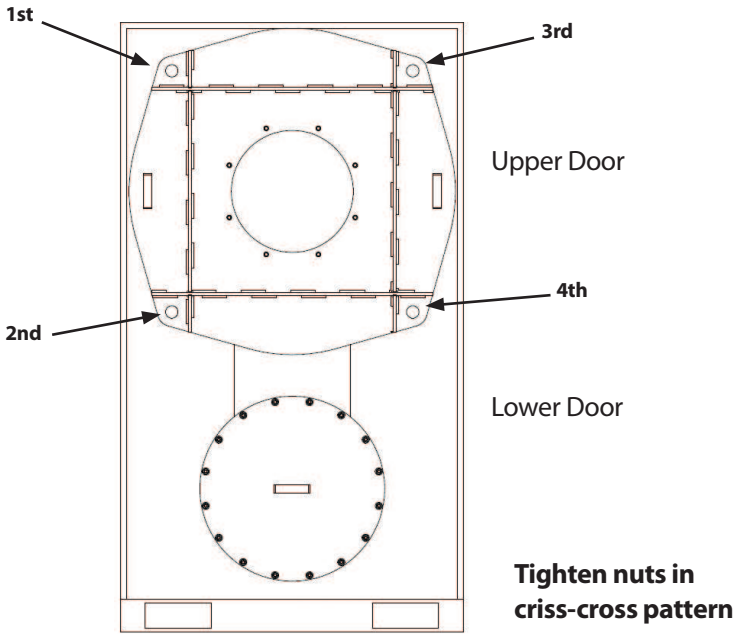

FIGURE 15 - VERIFYING TORQUE SETTINGS (FRONT VIEW, PANELS REMOVED)

6. Do not replace any of the bolts, nuts, washers, gaskets or other boiler components without consulting the factory. Any replacement components must be to factory specifications.
7. Once all bolts are tightened to proper torque, replace the boiler jacket panels.
8. To confirm proper seal on the door after this procedure has been conducted, ensure there are no flue gases present around the boiler once unit is running.

Inspecting/Cleaning the Flue Passages

For boilers firing on Natural Gas or Propane, there is no need to inspect the flue passages of the boiler unless the technician suspects damage or malfunction.

■ Boilers Firing on #2 Oil, B100 Bio-Diesel, Digester Gases or Any Other Substance Besides Natural Gas or Propane

Inspect the duplex stainless steel flue passages every 4,000 hours of operation (not including hours operating on Natural Gas or Propane). This is the bottom section of the heat exchanger and will not require removal of the burner or fuel train.

■ Procedure for Accessing the Duplex Stainless Steel Flue Passages (all models)

1. Lock out the power supply to the boiler and isolate the fuels supplied to the unit.

CAUTION

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

All maintenance procedures should be completed by trained personnel. Appropriate training and instructions are available from the Fulton Service Department at (315) 298-5121 or your local Fulton Heating Solutions Representative.

In order to meet warranty conditions, ensure all appropriate maintenance activities are performed.

WARNING

All information in this manual is for reference and guidance purposes, and does not substitute for required professional training, conduct, and strict adherence to applicable jurisdictional/professional codes and regulations.

CAUTION

All maintenance procedures should be completed by trained personnel. Appropriate training and instructions are available from the Fulton Service Department at (315) 298-5121 or your local Fulton Heating Solutions Representative.

2. Remove the front lower jacket panel from the boiler.
3. Remove the flue passage cover and turbulators.
4. If deemed necessary, clean the flue passages with the proper equipment, such as round wire brushes and a wet/dry shop vacuum or soot vacuum system.
5. Insert the turbulators back into position.
6. Reinstall the flue passage cover. Confirm torque to 23 ft/lbs on all bolts. Do not replace any bolts, nuts, washers or other components without consulting the factory.
7. Restore power to the unit and restore fuel to the unit.
8. Fire the boiler and set combustion to proper levels.
9. To confirm proper seal on the door after this procedure has been conducted, ensure there are no flue gases present around the boiler once unit is running.
10. If evidence of extensive soot, scaling or corrosion is present in the duplex stainless steel flue passages, this may indicate that removal of the burner and cleaning of the furnace and upper flue passages is required. Please contact Fulton's service department for more information and instructions, as requirements vary by model and burner selection.

Replacing a Servomotor and Related Components

If it is determined that a servomotor needs replacement or you are experiencing reliability issues with the servomotor assembly, Fulton recommends installing a Siemens Servo Gas and Butterfly Valve Assembly. This assembly includes the gas butterfly valve, bracket, coupling and servo assembly. Replacing this entire assembly may not be appropriate for all applications, thus the servo motors are available individually as well. The installing technician must verify that the bracket allows for proper alignment and that the coupling to shaft connections are secured adequately.

If it is determined that a servomotor needs replacement, adhere to the following:

1. Verify the model number of the new servomotor is the same as the old servo motor. The model number starts with the letters SQM and is displayed on a label on the side of the motor. Proceed only after model number is verified.
2. Turn power to the boiler off.
3. Turn off all electricity to the boiler.
4. Remove the cover on the servomotor to be changed.
5. Remove the green wiring plugs and the conduit termination point from the motor by pulling them towards you. A black grounding wire runs from the motor to the conduit termination point. Pull it off from the conduit

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termination point. Also note the location of the jumper on the left side of the motor.

6. Loosen the Allen screws on the motor end of the motor to valve coupling.
7. Unbolt the motor from the mounting bracket and remove the motor.
8. Turn the valve so it is in the closed position and can rotate clockwise to open.
9. Mark the coupling or valve shaft if needed so the position of the valve can be determined when the servomotor is installed.
10. Bolt the new servo motor on to the mounting bracket with the motor shaft inserted into the coupling.
11. Rotate the valve shaft/coupling assembly closed as stated above.
12. While holding the valve closed, tighten the Allen screws on the coupling.
13. Install the wired green wiring plugs and the conduit termination point on the new motor. Connect the black grounding wire from the motor to the conduit termination point.
14. Verify the jumper on the motor is located on the same pins as the motor that was replaced.
15. Turn power to the boiler on.
16. **For Siemens LMV51:**
    - » The screen will display "system test". The fault "Fault Feedback Air Actuator" will be displayed. DO NOT RESET THIS FAULT YET. Press Escape twice to clear the fault from the screen.
    - » Press Escape to get to the main menu. Under Params&Display > Actuators > Addressing, select either the gas actuator or air actuator depending upon which was replaced. The control will run an actuator check then display "Start Address Assignment with ENTER". Press Enter. The display will then have you press the addressing button on the actuator. This is the red button on the actuator. The screen will then display 'Actuator Address Assignment Successful'.
    - » Press Escape until the main menu is reached. Under OperationalStat > Status/Reset, reset the fault.
17. The boiler emissions may not be correct after changing the servomotor. Verify the emissions throughout the range of modulation. If emissions are off, the servomotor can be adjusted by following the procedure in the Commissioning the Boiler section of this manual.
18. Attach cover to the servomotor.

After All Repairs and Maintenance

1. Follow "Pre-Start Check List" provided with the unit, and all Safety Checks.
2. Fire the Boiler and perform combustion check.
3. Make any necessary adjustments.

Troubleshooting

Use the tables on the following pages as a guide to troubleshooting your boiler.

TROUBLESHOOTING

PROBLEM	CAUSE	CHECK
Control does not illuminate	Power supply	Check fuse or circuit breaker. Reset or replace as necessary.
Fan will not start	High temperature is tripped	1. Reset switch 2. Replace switch
	Low gas is tripped	1. Reset switch 2. Replace switch
	High gas is tripped	1. Reset switch 2. Replace switch
	UT32A incorrectly set/no heat	Adjust UT32A
	Flame detector has detected light/scanner	1. Identify light source, remove 2. Replace flame detector
	Air switch is made when fan is not on	1. Reset switch 2. Replace switch
	Blower contactor made when fan not on	Replace motor contactor
	Gas valve proof of closure defective	Replace valve
	Loose wire connection	Check wiring
Pilot Fails	Insufficient gas supply	1. Verify the manuals shut off valves are open allowing gas flow to the pilot tube. 2. Adjust incoming gas pressure to match the start up report. 3. Adjust pilot gas pressure regulator to match the start up report.
	Pilot valve fails to open	1. Check pilot gas pressure at the burner. 2. Verify operation of the valve. If pressure does not increase when the valve is supposed to open, replace valve.
	Air in pilot gas line	Have the boiler attempt to light up to three times. If the boiler fails to light, call Fulton.
	Ignitor failure	1. Check the gap between the top of the electrode and the pilot tube wall. The gap should be 1/16". Adjust the gap. 1. Check for cracked porcelain. Replace electrode.
	Combustion air not sufficient	1. Verify the over burner pressure matches the start up report. Adjust the servo setting. 2. Verify there is enough make up air in the room. 3. (For direct vent only) Verify venting is not obstructed.
	Flame Detector Defective	1. Visually verify the flame through the site glass. 2. Remove flame detector and visually verify flame through the scanner tube. 3. Verify the flame detector eye is not dirty. 4. Replace flame detector.
	Gas filter blocked	Replace gas filter.

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PROBLEM	CAUSE	CHECK
Main flame fails	Gas actuator not set properly	1. Verify the last elbow gas pressure matches the start up report. 2. Adjust actuator setting.
	Air actuator not set properly	1. Verify the over burner pressure matches the start up report. 2. Adjust actuator motor.
	Flame detector failure	1. Visually verify the flame through the sight glass. 2. Remove flame detector and visually verify the flame through the scanner tube. 3. Verify the flame detector eye is not dirty. 4. Replace scanner.
	Insufficient Gas Supply	1. Verify the manual shut down valves are open, allowing gas flow through the gas train. 2. Adjust incoming gas pressure to match the start up report.
	Gas Filter Blocked	Replace gas filter.
	Air supply blocked (direct vent only)	Verify venting is not obstructed.
Boiler fails while modulating	Gas actuator not set properly	1. Verify the last elbow matches the start up report. 2. Adjust actuator setting.
	Air actuator not set properly	1. Verify the over burner pressure matches the start up report. 2. Adjust actuator setting.
	Air supply blocked (direct vent only)	Verify venting is not obstructed.
Poor combustion	Gas actuator not set properly	Adjust actuator setting.
	Air actuator not set properly	Adjust actuator setting.
Manual Reset limit device trips	Manual Reset Limits include: Flame safeguard, high or low gas pressure, high temperature limit	DO NOT reset without determining and correcting the cause.
Power outage to the boiler room	Entire boiler system is disabled and de-energized.	When power has returned, the boiler will have to be manually reset, as it will be in the lockout position
Gas Pressure alarm is annunciated	Either insufficient gas pressure or the gas pressure to the manifold is too high for safe and proper operation of the boiler. This shuts down the burner. When gas pressure is restored, the annunciated alarm will remain on and the boiler will remain locked out until the gas pressure switch is manually reset.	Locate cause and correct. In the event of a high gas manifold pressure condition, qualified service personnel must correct the problem before restarting the boiler.
High water temp alarm is annunciated	Boiler water has exceeded both the operating and high-limit temperature. When the water temperature falls below the high-limit temperature, the boiler will remain locked out until the controller is manually reset.	Locate cause and correct. Once the control is reset, the sequence returns to normal operation provided that the other limits are satisfied.

PROBLEM	CAUSE	CHECK
Low Air Flow Supply indicated on low air switch	Low Air is annunciated if the airflow switch detects low airflow through the boiler.	The air switch has been factory set and should not be adjusted in the field. An extended low air indication does not mean that the low air switch is defective. Check that blower is power and feedback plugs are clipped into the blower. Check that the burner is clean by observing through the venturi. Check the blower purge speed and low fire speed is correctly displayed on the touch screen. Check for obstructions in the vent. Check for obstructions in the air inlet.
High Back Pressure Switch trip/boiler shutdown	Excessive Vent Pressure	This condition will automatically recycle, so the boiler will try to relight. The vent and heat exchanger should be checked for obstructions and cleaned.
Main flame failure during firing period	Main gas control valve is de-energized and the control goes into “lockout” mode. Flame failure occurs and the indicator is illuminated.	The programmer must be manually reset.
Ignition Failure	If UV scanner/flame rod does not detect the flame during the 4-second trial-for-ignition period, the gas valve and spark ignition are de-energized. At this time a safety lockout occurs.	Identify and correct.

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Standard Warranty for Fulton Vantage Hydronic Boilers *Effective: 09/19/2011*

LIFETIME THERMAL SHOCK WARRANTY

The Vantage pressure vessel is warranted against failure due to thermal shock for the lifetime of the boiler provided the boiler is installed, controlled, operated and maintained in accordance with the Installation, Operation and Maintenance Manual. This warranty does not cover damage due to corrosion, scaling, sooting and/or improper installation, operation and maintenance. Thermal shock is defined as a pressure vessel failure determined, by Fulton Heating Solutions, to be caused by uneven expansion of the materials of construction.

FIVE (5) YEAR PRESSURE VESSEL WARRANTY

The pressure vessel and heat exchanger is covered against failures resulting from flue gas corrosion (when firing on natural gas or propane), and/or defective material or workmanship for a period of five (5) years from the date of shipment from the factory. Waterside corrosion or scaling is not covered. Fulton Heating Solutions (Fulton) will repair, replace, exchange or credit at our option, FOB factory, the pressure vessel as defined above, provided this equipment has been installed, operated and maintained by the buyer in accordance with the Installation, Operation and Maintenance Manual. When firing #2 fuel oil, a minimum return temperature of 140 F is required and flue gas condensate corrosion is not warranted.

PARTS WARRANTY

Fulton will repair or replace any part of the Vantage boiler found to be defective in workmanship or material within 18 months of shipment from the factory or 12 months from start up (whichever comes first). Fulton shall be notified in writing as soon as any defect becomes apparent. Defective parts must be returned to Fulton for evaluation and warranty consideration.

GENERAL

Fulton shall be notified in writing as soon as any defect becomes apparent. This warranty does not include freight, handling or labor charges of any kind. No Sales Manager or other representative of Fulton other than the Quality Manager or an officer of the company has warranty authority. Fulton will not pay any charges unless they were pre-approved, in writing, by the Fulton Quality Manager.

This warranty is exclusive and in lieu of all other warranties, expressed or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Fulton shall in no event by liable for any consequential or incidental damages arising in any way, including but not limited to any loss of profits or business, even if Fulton has been advised of the possibility of such damages. Fulton's liability shall never exceed the amount paid to Fulton for the original equipment found to be defective.

CONDITIONS OF WARRANTY

Warranties are only valid if the boiler is installed, operated and maintained as outlined in the Installation, Operation and Maintenance Manual. Fulton shall accept no responsibility if the equipment has been improperly installed, operated or maintained or if the buyer has permitted any unauthorized modification, adjustment, and/or repairs to the equipment. The use of replacement parts not manufactured or authorized by Fulton will void any warranty express or limited.

Warranty coverage for all components and equipment in said warranty are not valid unless the boiler is started up by a factory certified technician. The commissioning agency must successfully complete and return the equipment Installation and Operation Checklist to Fulton's Service department within twelve (12) weeks of startup.

The boiler must be maintained in accordance with the product manual and annual combustion and maintenance reports must be produced for warranty consideration. The warranty is valid for the original installation and original owner only.

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Parts

Spare and replacement parts may be ordered from your local representative or through the Fulton Companies. When ordering replacement parts, please have the model number and serial number of your Fulton boiler ready. Factory-direct replacement parts must be used to ensure proper equipment operation and adherence with warranty requirements. Contact Fulton Companies at (315) 298-5121 for further information.

WARNING

Use of non-factory authorized replacement parts is not recommended for this equipment. Use of non-factory authorized parts may jeopardize safety and system performance, and voids the product warranty.

■ Standard - Maxon Burner

VANTAGE STANDARD - MAXON BURNER					
PART NUMBER	DESCRIPTION	MODEL 2000	3000	4000	6000
	BURNER/BLOWER				
5-10-003070	8" AIR BUTTERFLY VALVE, FLANGED, ALUMINUM	X	X	X	
2-30-000486	AIR SWITCH 3-11"WC #1910-10	X	X	X	
2-45-000532	BURNER DISCHARGE SLEEVE GASKET 10", #28477		X	X	
2-45-000533	BURNER DISCHARGE SLEEVE GASKET 8", #28476	X			
2-30-000244	FAN GUARD SCREEN	X	X	X	
2-40-000599	FAN MOTOR 3 HP 208-230/460/60/3 TEFC C-FACE		X		
2-40-000622	FAN MOTOR 5 HP 460/60/3 TEFC C-FACE VM3613T			X	
2-30-000643	FAN TURBO WHEEL 1-1/8" SHAFT, #13-8-5			X	
5-21-003193	FAN HOUSING FOR TURBO WHEEL #13-8-5			X	
2-30-003059	FAN, HOUSING & 2 HP MOTOR	X			
2-30-003060	FAN, HOUSING & 3 HP MOTOR		X		
2-45-000524	IGNITER, 5.875" W/O 0.375 TIP, #47232	X	X	X	
4-40-003020	IGNITION WIRE SET ASSEMBLY VTG-2000	X			
4-40-003030	IGNITION WIRE SET ASSEMBLY VTG-3000		X		
4-40-003040	IGNITION WIRE SET ASSEMBLY VTG-4000			X	
2-12-000262	EB3 REFRACTORY RING VTG-2000, 17-1/2" OD X 12-1/8" ID	X			
2-12-000261	EB4 REFRACTORY RING VTG-3000, 18-3/4" OD X 14-5/16" ID		X		
2-12-000266	EB5 REFRACTORY RING VTG-4000, 22-7/8" OD X 14-3/16" ID			X	
2-30-001605	BURNER EB3 VTG-2000 NAT GAS #EB3MRV	X			
2-30-001603	BURNER EB4 VTG-3000 NAT GAS #EB4MRV		X		
2-30-001609	BURNER EB5 VTG-4000 NAT GAS #1121231			X	
2-30-001606	PROPANE NOZZLE FOR EB3 MAXON BURNER, #51296	LP			
2-30-001602	PROPANE NOZZLE FOR EB4 MAXON BURNER, 51298		LP		
2-45-000528	RECTANGULAR BURNER AIR INLET GASKET, #50556	X			
2-45-000527	RECTANGULAR BURNER AIR INLET GASKET, #50562		X		
2-12-003048	RECTANGULAR BURNER AIR INLET GASKET			X	
2-45-000530	ROUND BURNER AIR INLET GASKET 4", #06936	X			
2-45-000529	ROUND BURNER AIR INLET GASKET 6", #07015		X		
2-12-003049	RECTANGULAR BLOWER GASKET FOR FAN HOUSING			X	
2-40-000472	AIR SERVO MOTOR (FOR LMV 37) #SQM33.550A9	X	X	X	
2-40-001084	SQM 33 AIR SERVO COUPLING W/ SET SCREW	X	X	X	
2-40-000475	UV SCANNER (FOR LMV 37) #QRA4.U	X	X	X	
	GAS TRAIN				
2-30-000401	1" VENT VALVE ASSEMBLY (DBB), #8215C53	X	X	X	
2-30-000281	1-1/2" BALL VALVE, #80-107-01	X	X		
2-30-000510	1-1/2" ECLIPSE BUTTERFLY VALVE	X	X		
2-40-001080	1-1/2" ECLIPSE BUTTERFLY VALVE ASSEMBLY W/SQM33 SERVO	X	X		
2-30-000516	1-1/2" REGULATOR (1 PSI MAX) RV81	X			
2-30-000003	1-1/2" SINGLE SHUTOFF VALVE, #VGG10.404U	X	X		

Contact Factory

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VANTAGE STANDARD - MAXON BURNER						
PART NUMBER	DESCRIPTION	MODEL 2000	3000	4000	6000	
2-30-000280	1-1/4" BALL VALVE, #80-106-01	LP	LP			
2-30-000509	1-1/4" ECLIPSE BUTTERFLY VALVE	LP	LP			
2-40-001081	1-1/4" ECLIPSE BUTTERFLY VALVE ASSEMBLY W/SQM33 SERVO	LP	LP			
2-30-000515	1-1/4" REGULATOR (1 PSI MAX) RV81	LP	LP			
2-30-000220	1/4" UL BALL VALVE, #80-101-01	X	X	X		
2-35-001008	2" NPT ADAPTER FOR DOUBLE BODY GAS VALVE (DBB)	X	X	X		
2-30-000517	2" REGULATOR (1 PSI MAX) RV91		X			
2-30-000116	2" UL BALL VALVE, #80-108-01			X		
2-30-000511	2" ECLIPSE GAS BUTTERFLY VALVE			X		
2-40-001082	2" ECLIPSE BUTTERFLY VALVE ASSEMBLY W/SQM33 SERVO			X		
2-30-000679	2" REGULATOR (5 PSI MAX), #210E-1616-0007			X		
2-30-000004	2" SINGLE SHUTOFF VALVE, #VGG10.504U			X		
2-40-000390	HIGH GAS PRESSURE SWITCH W/MR 2-20" WC - #QPH31.050M00	X	X	X		
2-40-000387	LOW GAS PRESSURE SWITCH W/MR 1-20"WC - #QPL31.050M00	X	X	X		
2-40-000380	MAIN DOUBLE BODY GAS VALVE, #VGD20.503U	X	X	X		
5-10-003033	SERVO BRACKET FOR 3/4" THRU 1-1/2" GAS BUTTERFLY VALVE	X	X	X		
2-40-001083	SQM 33 GAS SERVO COUPLING #CCM10DCA-M10RXA	X	X	X		
2-40-000381	SHUTOFF VALVE ACTUATOR #SKP15.011U1	X	X	X		
2-40-000472	SQM33 GAS SERVO MOTOR FOR LMV37 CONTROL #SQM33.550A9	X	X	X		
	GENERAL ELECTRICAL COMPONENTS					
2-40-000440	1KVA STEPDOWN TRANSFORMER 208/120-50/60HZ #T-2-53140-1S	X	X	X		
2-40-000441	0.75KVA STEPDOWN TRANSFORMER 480/120-50/60HZ #T-2-53009-S	X	X	X		
2-40-000442	0.75KVA STEPDOWN TRANSFORMER 600/120-50/60HZ #T-2-53109-S	X	X	X		
2-40-000294	100-200°F HIGH LIMIT AQUASTAT W/66" CAPILLARY #L4008E-1313	X	X	X		
2-40-000251	100-240°F OPERATING AQUASTAT #L6008A-1010	X	X	X		
2-45-000309	BLACK 2 POSITION SWITCH #3SB3202-2KA11	X	X	X		
3-53-005003	600V FUSE ASSEMBLY	X	X	X		
3-53-005004	480V FUSE ASSEMBLY	X	X	X		
3-53-005005	230V FUSE ASSEMBLY	X	X	X		
3-53-005006	208V FUSE ASSEMBLY	X	X	X		
2-40-000648	3RB2016-2PB0 OVERLOAD 1.5-6 AMP W/MR	X				
2-40-000573	3RB2016-2SB0 OVERLOAD 3-12 AMP W/MR		X	X		
2-40-000878	3RT1015-1AK6 MOTOR CONTACTOR 7 AMP 120V	X				
2-40-000567	3RT1016-1AK6 MOTOR CONTACTOR 9 AMP 120V		X	X		
2-40-000801	4 X 12 TYPE J THERMOCOUPLE #92-006-04-20	X	X	X		
2-40-000082	6 KV 120V/60HZ GAS IGNITION TRANSFORMER #A06-SC2	X	X	X		

Contact Factory

VANTAGE STANDARD - MAXON BURNER					
PART NUMBER	DESCRIPTION	MODEL 2000	3000	4000	6000
2-45-000918	ALARM HORN #TMC-V86-201-Q	X	X	X	Contact Factory
2-40-000131	GENERAL PURPOSE (ICE CUBE) RELAY 120V-AB #700HA32A1	X	X	X	
2-40-000096	BASE FOR ICE CUBE RELAY #700HN125	X	X	X	
2-45-000412	GREEN 120V PILOT LIGHT #3SB3248-6BA40	X	X	X	
2-45-000305	RED PUSH BUTTON LIGHT #3SB3001-0BA21	X	X	X	
2-40-000471	LMV37 CONTROL - #LMV37.420A1	X	X	X	
2-40-000473	AZL DISPLAY MODULE FOR LMV37 CONTROL - #AZL23.00A9	X	X	X	
2-40-000474	PLUG CONNECTOR SET FOR LMV37 CONTROL - #AGG3.131	X	X	X	
2-40-000421	LOW WATER CUT OFF RELAY #26MB1M0-FF	X	X	X	
3-53-005060	NON-FUSED DISCONNECT	X	X	X	
2-40-000384	SIEMENS RWF40 TEMP CONTROL - #RWF40.001A97	X	X	X	
2-40-000386	OUTDOOR TEMPERATURE SENSOR FOR RWF40 CONTROL - #QAC22	X	X	X	
2-40-000830	THERMOCOUPLE WIRE (PER FT) #J20-5-502	X	X	X	
2-40-000863	UT-320 YOKOGAWA TEMPERATURE CONTROL	X	X	X	
	FUSES				
2-45-000387	7-1/2 AMP TIME DELAY FUSE #ATQR7-1/2	X	X	X	
2-45-001000	2 AMP FUSE #ATQR2 - (REPLACES FNQ-R-2)	X	X	X	
2-45-000381	3 AMP FUSE #ATQR3 - (REPLACES FNQ-R-3)	X	X	X	
2-45-000998	4 AMP FUSE #ATQR4 - (REPLACES FNQ-R-4)	X	X	X	
2-45-000995	5 AMP FUSE #ATQR5 - (REPLACES FNQ-R-5)	X	X	X	
2-45-000371	FUSE HOLDER #USM1	X	X	X	
2-45-000368	2 AMP FUSE #ATMR2 - (REPLACES KTKR-2)	X	X	X	
2-45-000366	4 AMP FUSE #ATMR4 - (REPLACES KTKR-4)	X	X	X	
2-45-000367	5 AMP FUSE #ATMR5 - (REPLACES KTKR-5)	X	X	X	
2-45-000365	8 AMP FUSE #ATMR8 - (REPLACES KTKR-8)	X	X	X	
2-45-000380	10 AMP FUSE #ATMR10 - (REPLACES KTKR-10)	X	X	X	
2-45-000465	12 AMP FUSE #ATMR12 - (REPLACES KTKR-12)	X	X	X	
2-45-000214	LPJ 1-6/10 AMP FUSE BUSSMAN LOW PEAK	X	X	X	
2-45-000151	2 AMP FUSE #AJT2 - (REPLACES LPJ-2)	X	X	X	
2-45-000360	3 AMP FUSE #AJT3 - (REPLACES LPJ-3)	X	X	X	
2-45-000361	LPJ 4 AMP FUSE BUSSMAN LOW PEAK	X	X	X	
2-45-000250	5 AMP FUSE #AJT5 - (REPLACES LPJ-5)	X	X	X	
2-45-000363	7 AMP FUSE #AJT7 - (REPLACES LPJ-7)	X	X	X	
2-45-000267	10 AMP FUSE #AJT10 - (REPLACES LPJ10-SP)	X	X	X	
	TRIM / MISC.				
2-12-000049	1" FLAT ROPE GASKET (PER FT)	X	X	X	
2-45-000040	1/2" KNOCKOUT PLUGS #2643	X	X	X	
2-12-000210	1/4" ROPE GASKET (PER FT)	X	X	X	
2-22-000035	12-14 X 3/4" SELF-TAPPING HEX HEAD SCREWS	X	X	X	
2-12-000416	4" 150# ELASTAGRAPH RING GASKET 1/8THK SS304	X	X		

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VANTAGE STANDARD - MAXON BURNER					
PART NUMBER	DESCRIPTION	MODEL 2000	3000	4000	6000
2-12-000420	6” 150# ELASTAGRAPH RING GASKET 1/8THK SS304			X	Contact Factory
2-23-000295	6 OZ. TOUCHUP SPRAY PAINT - SMOKY ASH	X	X	X	
2-45-000053	7/8” KNOCKOUT PLUGS #2703	X	X	X	
4-57-000440	CONDENSATE DRAIN KIT ASSEMBLY	X	X	X	
2-10-000168	FLOAT ASSEMBLY FOR CONDENSATE DRAIN KIT	X	X	X	
2-12-001029	INSULATION SET VTG-2000	X			
2-12-001027	INSULATION SET VTG-3000		X		
2-12-001019	INSULATION SET VTG-4000			X	
2-60-000003	LOCKTITE THREAD SEALANT 250ML TUBE #565-41-250	X	X	X	
2-12-000533	PRIMARY PV MILL BOARD GASKET VTG-2000	X			
2-12-000511	PRIMARY PV MILL BOARD GASKET VTG-3000		X		
2-12-000544	PRIMARY PV MILL BOARD GASKET VTG-4000			X	
2-10-000291	PRIMARY PV TURBULATOR VTG-2000	X			
2-11-CH1001	PRIMARY PV TURBULATOR VTG-3000		X		
2-10-000292	PRIMARY PV TURBULATOR VTG-4000			X	
2-12-000905	SECONDARY HEAT EXCHANGER DOOR GASKET 14”OD X 12”ID	X	X	X	
2-10-000287	SECONDARY HEAT EXCHANGER TURBULATOR	X	X	X	
2-20-000023	3” WATER LEVEL PROBE	X	X	X	
	SAFETY RELIEF VALVE				
2-30-000221	1-1/4” SAFETY VALVE 30 PSI #10-616-05	X	X		
2-30-000922	1-1/2” SAFETY VALVE 30 PSI #10-617-05			X	
2-30-000951	1” SAFETY VALVE 60 PSI #10-615-12	X			
2-30-000266	1-1/4” SAFETY VALVE 60 PSI #10-616-12		X	X	
2-30-000145	3/4” SAFETY VALVE 100 PSI #10-614-20	X			
2-30-000921	1” SAFETY VALVE 100 PSI #10-615-20		X	X	
2-30-000020	3/4” SAFETY VALVE 125 PSI #10-614-25	X	X		
2-30-000904	1” SAFETY VALVE 125 PSI #10-615-25			X	
2-30-000166	3/4” SAFETY VALVE 160 PSI #10-614-36	X	X	X	

■ Dual Fuel - Riello Burner

VANTAGE DUAL FUEL - RIELLO BURNER					
PART NUMBER	DESCRIPTION	MODEL 2000	3000	4000	6000
	BURNER/BLOWER				Contact Factory
2-30-000343	0-400 PSI GAUGE (LIQUID FILLED) #Q817	X	X	X	
2-30-000220	1/4” UL BALL VALVE, #80-101-01	X	X	X	
2-30-001619	AIR PRESSURE SWITCH #3012948		X	X	
2-30-001640	BURNER/BLOWER ASSEMBLY RLS 100E VTG-2000DF	X			
2-30-001612	BURNER/BLOWER ASSEMBLY RLS 130E VTG-3000DF		X		
2-30-001612	BURNER/BLOWER ASSEMBLY RLS 130E VTG-4000DF			X	

VANTAGE DUAL FUEL - RIELLO BURNER					
		MODEL			
PART NUMBER	DESCRIPTION	2000	3000	4000	6000
2-40-000833	BURNER/BLOWER CONTACTOR 208-230/460V VTG-2000DF #3012936	X			Contact Factory
2-30-001624	BURNER/BLOWER CONTACTOR 208-230/460V VTG-3000DF #3012937		X		
2-30-001624	BURNER/BLOWER CONTACTOR 208-230/460V VTG-4000DF #3012937			X	
2-12-001033	BURNER DISCHARGE SLEEVE GASKET 10-1/2" X 10-1/2"	X	X	X	
2-12-000263	BURNER REFRACTORY RING VTG-2000DF 17-1/8" OD X 10-1/4" ID	X			
2-12-000259	BURNER REFRACTORY RING VTG-3000DF 18-3/4" OD X 10-1/4" ID		X		
2-12-000265	BURNER REFRACTORY RING VTG-4000DF 22-7/8" OD X 10-1/4" ID			X	
2-30-001626	BURNER MOTOR 208-230/460V #3012943		X	X	
2-30-001625	BURNER FAN WHEEL #3012940		X	X	
2-30-001621	GAS IGNITION ELECTRODE #3013052	X	X	X	
2-30-001634	GAS IGNITION TRANSFORMER #3012956		X	X	
2-30-001630	OIL BAR #3003592		X	X	
2-30-001631	OIL CORK #3003681		X	X	
2-30-001623	OIL DRIVE COUPLING #3013051	X	X	X	
2-30-001627	OIL HT LEAD #3012959	X	X	X	
2-30-001628	OIL IGNITION ELECTRODES #3013040 & 3013041	X	X	X	
2-30-001622	OIL IGNITION TRANSFORMER #3012938		X	X	
2-30-000803	OIL NOZZLE, 5GPH 45 DEG. #C5222470	X			
2-30-000807	OIL NOZZLE, 5GPH 60 DEG. #C5222450	X			
2-30-001635	OIL NOZZLE, 7.5GPH 45 DEG. #C5222438		X		
2-30-001636	OIL NOZZLE, 11GPH 60 DEG. #C5222446			X	
2-30-001618	LOW OIL PRESSURE SWITCH #3012384		X	X	
2-30-001633	OIL PUMP #3013523	X	X	X	
2-30-001632	OIL PUMP MOTOR 208-230/460V #3013031		X	X	
2-30-001651	OIL PUMP SUPPLY & RETURN FITTING #3013524	X	X	X	
2-30-001650	OIL PUMP SUPPLY & RETURN FITTING SEAL/METAL WASHER #3007079	X	X	X	
2-30-001629	OIL VALVE #3012952	X	X	X	
2-30-001620	PILOT HT LEAD #3013140	X	X	X	
2-40-000434	SQM45 AIR SERVO MOTOR (LMV 51/52) #SQM45.295A9	X	X	X	
2-40-000436	IR SCANNER SIDEVIEW (LMV 51/52) #QRI2B2.B180B	X	X	X	
	GAS TRAIN				
2-30-000401	1" VENT VALVE ASSEMBLY (DBB), #8215C53	X	X	X	
2-30-000281	1-1/2" BALL VALVE, #80-107-01	X			
2-30-000516	1-1/2" REGULATOR (1 PSI MAX) RV81	X			
2-30-000003	1-1/2" SINGLE SHUTOFF VALVE, #VGG10.404U	X			
2-30-000220	1/4" UL BALL VALVE, #80-101-01	X	X	X	

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VANTAGE DUAL FUEL - RIELLO BURNER					
		MODEL			
PART NUMBER	DESCRIPTION	2000	3000	4000	6000
2-35-001008	2" NPT ADAPTER FOR DOUBLE BODY GAS VALVE (DBB)	X	X	X	
2-30-000679	2" REGULATOR (5 PSI MAX), #210E-1616-0007			X	
2-30-000116	2" UL BALL VALVE, #80-108-01		X	X	
2-30-000517	2" REGULATOR (1 PSI MAX) RV91		X		
2-30-000004	2" SINGLE SHUTOFF VALVE, #VGG10.504U		X	X	
2-40-000390	HIGH GAS PRESSURE SWITCH W/MR 2-20" WC - #QPH31.050M00	X	X	X	
2-40-000380	MAIN DOUBLE BODY GAS VALVE, #VGD20.503U	X	X	X	
2-40-000387	LOW GAS PRESSURE SWITCH W/MR 1-20"WC - #QPL31.050M00	X	X	X	
2-30-000181	GREEN SPRING FOR RV91 & 210E REGULATOR			X	
2-30-000463	RED SPRING FOR RV91 GAS PRESSURE REGULATOR		X		
2-40-000381	SHUTOFF VALVE ACTUATOR #SKP15.011U1	X	X	X	
2-40-000434	SQM45 GAS SERVO MOTOR (LMV 51/52) #SQM45.295A9	X	X	X	
	PILOT LINE				
2-30-000111	1/2" UL BALL VALVE #80-103-01	X	X	X	
2-30-000677	1/2" 325-3 PILOT GAS REGULATOR #325-3-44-0002	X	X	X	
2-30-000298	1/2" PILOT SOLENOID VALVE 120/60 #8214G020	X	X	X	
2-30-001617	RED SPRING FOR 325-3 PILOT REGULATOR #R325C10-1022		X	X	
	GENERAL ELECTRICAL COMPONENTS				
2-40-000440	1KVA STEPDOWN TRANSFORMER 208/120-50/60HZ #T-2-53140-1S	X	X	X	
2-40-000441	0.75KVA STEPDOWN TRANSFORMER 480/120-50/60HZ #T-2-53009-S	X	X	X	
2-40-000442	0.75KVA STEPDOWN TRANSFORMER 600/120-50/60HZ #T-2-53109-S	X	X	X	
2-40-000294	100-200°F HIGH LIMIT AQUASTAT W/66" CAPILLARY #L4008E-1313	X	X	X	
2-40-000251	100-240°F OPERATING AQUASTAT #L6008A-1010	X	X	X	
2-45-000309	BLACK 2 POSITION SWITCH #3SB3202-2KA11	X	X	X	
3-53-005003	600V FUSE ASSEMBLY	X	X	X	
3-53-005004	480V FUSE ASSEMBLY	X	X	X	
3-53-005005	230V FUSE ASSEMBLY	X	X	X	
3-53-005006	208V FUSE ASSEMBLY	X	X	X	
2-40-000648	3RB2016-2PB0 OVERLOAD 1.5-6 AMP W/MR	X	X	X	
2-40-000878	3RT1015-1AK6 MOTOR CONTACTOR 7 AMP 120V	X	X	X	
2-45-000918	ALARM HORN #TMC-V86-201-Q	X	X	X	
2-40-000449	LMV51 TEMPERATURE CONTROL 120V #LMV51.140C1	X	X	X	
2-40-000437	AZL DISPLAY MODULE #AZL52.40B1	X	X	X	
2-40-000430	CABLE FOR AZL DISPLAY #AGG5.635	X	X	X	
2-40-000447	CAN BUS WIRE (PER FT) #AGG5.643	X	X	X	
2-40-000429	LMV CONNECTOR PLUG SET #AGG5.720	X	X	X	

Contact Factory

VANTAGE DUAL FUEL - RIELLO BURNER					
		MODEL			
PART NUMBER	DESCRIPTION	2000	3000	4000	6000
2-40-000431	LMV POWER SUPPLY #AGG5.210	X	X	X	
2-40-000131	GENERAL PURPOSE (ICE CUBE) RELAY 120V-AB #700HA32A1	X	X	X	
2-40-000096	BASE FOR ICE CUBE RELAY #700HN125	X	X	X	
2-45-000412	GREEN 120V PILOT LIGHT #3SB3248-6BA40	X	X	X	
2-45-000305	RED PUSH BUTTON LIGHT #3SB3001-0BA21	X	X	X	
2-40-000421	LOW WATER CUT OFF RELAY #26MB1M0-FF	X	X	X	
3-53-005060	NON-FUSED DISCONNECT	X	X	X	
2-40-000386	OUTDOOR TEMPERATURE SENSOR FOR RWF40 CONTROL - #QAC22	X	X	X	
2-40-000819	RTD 3/16” OD WITH 4” INSERTION	X	X	X	
2-40-000830	THERMOCOUPLE WIRE (PER FT)	X	X	X	
	FUSES				
2-45-000387	7-1/2 AMP TIME DELAY FUSE #ATQR7-1/2	X	X	X	
2-45-001000	2 AMP FUSE #ATQR2 - (REPLACES FNQ-R-2)	X	X	X	
2-45-000381	3 AMP FUSE #ATQR3 - (REPLACES FNQ-R-3)	X	X	X	
2-45-000998	4 AMP FUSE #ATQR4 - (REPLACES FNQ-R-4)	X	X	X	
2-45-000995	5 AMP FUSE #ATQR5 - (REPLACES FNQ-R-5)	X	X	X	
2-45-000371	FUSE HOLDER #USM1	X	X	X	
2-45-000368	2 AMP FUSE #ATMR2 - (REPLACES KTKR-2)	X	X	X	
2-45-000366	4 AMP FUSE #ATMR4 - (REPLACES KTKR-4)	X	X	X	
2-45-000367	5 AMP FUSE #ATMR5 - (REPLACES KTKR-5)	X	X	X	
2-45-000365	8 AMP FUSE #ATMR8 - (REPLACES KTKR-8)	X	X	X	
2-45-000380	10 AMP FUSE #ATMR10 - (REPLACES KTKR-10)	X	X	X	
2-45-000465	12 AMP FUSE #ATMR12 - (REPLACES KTKR-12)	X	X	X	
2-45-000214	LPJ 1-6/10 AMP FUSE BUSSMAN LOW PEAK	X	X	X	
2-45-000151	2 AMP FUSE #AJT2 - (REPLACES LPJ-2)	X	X	X	
2-45-000360	3 AMP FUSE #AJT3 - (REPLACES LPJ-3)	X	X	X	
2-45-000361	LPJ 4 AMP FUSE BUSSMAN LOW PEAK	X	X	X	
2-45-000250	5 AMP FUSE #AJT5 - (REPLACES LPJ-5)	X	X	X	
2-45-000363	7 AMP FUSE #AJT7 - (REPLACES LPJ-7)	X	X	X	
2-45-000267	10 AMP FUSE #AJT10 - (REPLACES LPJ10-SP)	X	X	X	
	TRIM / MISC.				
2-45-000040	1/2” KNOCKOUT PLUGS #2643	X	X	X	
2-12-000210	1/4” ROPE GASKET (PER FT)	X	X	X	
2-22-000035	12-14 X 3/4” SELF-TAPPING HEX HEAD SCREWS	X	X	X	
2-12-000416	4” 150# ELASTAGRAPH RING GASKET 1/8THK SS304	X	X		
2-12-000420	6” 150# ELASTAGRAPH RING GASKET 1/8THK SS304			X	
2-23-000295	6 OZ. TOUCHUP SPRAY PAINT - SMOKY ASH	X	X	X	
2-45-000053	7/8” KNOCKOUT PLUGS #2703	X	X	X	
4-57-000440	CONDENSATE DRAIN KIT ASSEMBLY	X	X	X	
2-10-000168	FLOAT ASSEMBLY FOR CONDENSATE DRAIN KIT	X	X	X	

Contact Factory

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VANTAGE DUAL FUEL - RIELLO BURNER					
		MODEL			
PART NUMBER	DESCRIPTION	2000	3000	4000	6000
2-12-001029	INSULATION SET VTG-2000	X			Contact Factory
2-12-001027	INSULATION SET VTG-3000		X		
2-12-001019	INSULATION SET VTG-4000			X	
2-60-000003	LOCKTITE THREAD SEALANT 250ML TUBE #565-41-250	X	X	X	
2-12-000533	PRIMARY PV MILL BOARD GASKET VTG-2000	X			
2-12-000511	PRIMARY PV MILL BOARD GASKET VTG-3000		X		
2-12-000544	PRIMARY PV MILL BOARD GASKET VTG-4000			X	
2-10-000291	PRIMARY PV TURBULATOR VTG-2000	X			
2-11-CH1001	PRIMARY PV TURBULATOR VTG-3000		X		
2-10-000292	PRIMARY PV TURBULATOR VTG-4000			X	
2-12-000905	SECONDARY HEAT EXCHANGER DOOR GASKET 14"OD X 12"ID	X	X	X	
2-10-000287	SECONDARY HEAT EXCHANGER TURBULATOR	X	X	X	
2-20-000023	3" WATER LEVEL PROBE	X	X	X	
	SAFETY RELIEF VALVE				
2-30-000221	1-1/4" SAFETY VALVE 30 PSI #10-616-05	X	X		
2-30-000922	1-1/2" SAFETY VALVE 30 PSI #10-617-05			X	
2-30-000951	1" SAFETY VALVE 60 PSI #10-615-12	X			
2-30-000266	1-1/4" SAFETY VALVE 60 PSI #10-616-12		X	X	
2-30-000145	3/4" SAFETY VALVE 100 PSI #10-614-20	X			
2-30-000921	1" SAFETY VALVE 100 PSI #10-615-20		X	X	
2-30-000020	3/4" SAFETY VALVE 125 PSI #10-614-25	X	X		
2-30-000904	1" SAFETY VALVE 125 PSI #10-615-25			X	
2-30-000166	3/4" SAFETY VALVE 160 PSI #10-614-36	X	X	X	

■ Low Emissions - Bekaert Burner

VANTAGE LOW EMISSIONS - BEKAERT BURNER				
		MODEL		
PART NUMBER	DESCRIPTION	3000	4000	6000
	BURNER/BLOWER			Contact Factory
2-12-000012	3/4" SIGHT GLASS #P-750	X	X	
2-30-000260	AIR FILTER SWITCH #1910-5	X	X	
2-30-000739	AIR INLET FILTER 10" X 10" X 1" #CS10X10X1	X	X	
2-30-001638	BEKAERT MESH BURNER VTG-3000LE #100.238.004-C	X		
2-30-001643	BEKAERT MESH BURNER VTG-4000LE #100.238.005-D		X	
2-12-003030	BURNER GASKET SET	X	X	
5-10-003076	BURNER HOUSING VTG-3000LE	X		
5-10-003476	BURNER HOUSING VTG-4000LE		X	
2-12-000258	BURNER REFRACTORY VTG-3000LE 18-3/4" OD X 10"ID	X		

VANTAGE LOW EMISSIONS - BEKAERT BURNER				
		MODEL		
PART NUMBER	DESCRIPTION	3000	4000	6000
2-12-000267	BURNER REFRACTORY VTG-4000LE 22-5/8" OD X 10"ID		X	Contact Factory
5-10-003070	8" AIR BUTTERFLY VALVE, FLANGED, ALUMINUM	X	X	
2-30-000486	AIR SWITCH 3-11"WC #1910-10	X	X	
2-30-003032	ECLIPSE SIZE 5 BLOWER W/ 3HP MOTOR	X		
2-30-001121	ECLIPSE SIZE 6 BLOWER W/ 5HP MOTOR		X	
2-30-000244	FAN GUARD SCREEN	X	X	
2-40-000464	FLAME DETECTOR THERMAL BARRIER	X	X	
5-10-003075	GAS INJECTOR VTG-3000LE	X		
5-10-003475	GAS INJECTOR VTG-4000LE		X	
4-40-003030	IGNITION WIRE SET ASSEMBLY VTG-3000	X		
4-40-003040	IGNITION WIRE SET ASSEMBLY VTG-4000		X	
7-20-003015	PILOT TUBE ASSEMBLY	X	X	
2-12-003035	RECTANGULAR BLOWER GASKET VTG-3000LE	X		
2-12-003045	RECTANGULAR BLOWER GASKET VTG-4000LE		X	
2-40-000819	RTD 3/16" OD WITH 4" INSERTION	X	X	
2-40-001084	SQM33 AIR SERVO COUPLING W/ SET SCREW	X	X	
2-40-000472	SQM33 AIR SERVO MOTOR (FOR LMV 37) #SQM33.550A9	X	X	
2-40-000475	UV SCANNER (FOR LMV 37) #QRA4.U	X	X	
	GAS TRAIN			
2-30-000401	1" VENT VALVE ASSEMBLY (DBB), #8215C53	X	X	
2-30-000220	1/4" UL BALL VALVE, #80-101-01	X	X	
2-30-001124	2-1/2" NPT RV111 GAS PRESSURE REGULATOR #RV111-2020-0031		X	
2-35-001008	2" NPT ADAPTER FOR DOUBLE BODY GAS VALVE (DBB)	X	X	
2-30-000116	2" UL BALL VALVE, #80-108-01	X	X	
2-40-001082	2" ECLIPSE BUTTERFLY VALVE ASSEMBLY W/SQM33 SERVO	X	X	
2-30-000511	2" ECLIPSE GAS BUTTERFLY VALVE	X	X	
2-30-000679	2" REGULATOR (5 PSI MAX), #210E-1616-0007		X	
2-30-000517	2" REGULATOR (1 PSI MAX) RV91	X		
2-30-000004	2" SINGLE SHUTOFF VALVE, #VGG10.504U	X	X	
2-40-000381	SHUTOFF VALVE ACTUATOR #SKP15.011U1	X	X	
2-40-001083	SQM33 GAS SERVO COUPLING #CCM10DCA-M10RXA	X	X	
2-40-000472	SQM33 GAS SERVO MOTOR FOR LMV37 CONTROL #SQM33.550A9	X	X	
2-40-000390	HIGH GAS PRESSURE SWITCH W/MR 2-20" WC - #QPH31.050M00	X	X	
2-40-000387	LOW GAS PRESSURE SWITCH W/MR 1-20"WC - #QPL31.050M00	X	X	
2-40-000380	MAIN DOUBLE BODY GAS VALVE, #VGD20.503U	X	X	
	PILOT LINE			
2-30-000111	1/2" UL BALL VALVE #80-103-01	X	X	

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VANTAGE LOW EMISSIONS - BEKAERT BURNER				
		MODEL		
PART NUMBER	DESCRIPTION	3000	4000	6000
2-30-000298	1/2" PILOT SOLENOID VALVE 120/60 #8214G020	X	X	Contact Factory
2-30-000677	1/2" 325-3 PILOT GAS REGULATOR #325-3-44-0002	X	X	
	GENERAL ELECTRICAL COMPONENTS			
2-40-000440	1KVA STEPDOWN TRANSFORMER 208/120-50/60HZ #T-2-53140-1S	X	X	
2-40-000441	0.75KVA STEPDOWN TRANSFORMER 480/120-50/60HZ #T-2-53009-S	X	X	
2-40-000442	0.75KVA STEPDOWN TRANSFORMER 600/120-50/60HZ #T-2-53109-S	X	X	
2-40-000294	100-200°F HIGH LIMIT AQUASTAT W/66" CAPILLARY #L4008E-1313	X	X	
2-40-000251	100-240°F OPERATING AQUASTAT #L6008A-1010	X	X	
2-45-000309	BLACK 2 POSITION SWITCH #3SB3202-2KA11	X	X	
3-53-005003	600V FUSE ASSEMBLY	X	X	
3-53-005004	480V FUSE ASSEMBLY	X	X	
3-53-005005	230V FUSE ASSEMBLY	X	X	
3-53-005006	208V FUSE ASSEMBLY	X	X	
2-40-000082	6 KV 120V/60HZ GAS IGNITION TRANSFORMER #A06-SC2	X	X	
2-45-000918	ALARM HORN #TMC-V86-201-Q	X	X	
2-40-000131	GENERAL PURPOSE (ICE CUBE) RELAY 120V-AB #700HA32A1	X	X	
2-40-000096	BASE FOR ICE CUBE RELAY #700HN125	X	X	
2-45-001047	UNITRONICS TOUCH SCREEN PLC 24VDC #V350-35-RA22	X	X	
2-45-000412	GREEN 120V PILOT LIGHT #3SB3248-6BA40	X	X	
2-45-000305	RED PUSH BUTTON LIGHT #3SB3001-0BA21	X	X	
2-40-000471	LMV37 CONTROL - #LMV37.420A1	X	X	
2-40-000473	AZL DISPLAY MODULE FOR LMV37 CONTROL - #AZL23.00A9	X	X	
2-40-000474	PLUG CONNECTOR SET FOR LMV37 CONTROL - #AGG3.131	X	X	
2-40-000421	LOW WATER CUT OFF RELAY #26MB1M0-FF	X	X	
3-53-005060	NON-FUSED DISCONNECT	X	X	
2-40-000386	OUTDOOR TEMPERATURE SENSOR FOR RWF40 CONTROL - #QAC22	X	X	
2-40-000819	RTD 3/16" OD WITH 4" INSERTION	X	X	
2-40-000830	THERMOCOUPLE WIRE (PER FT)	X	X	
2-45-001074	VARIABLE FREQUENCY DRIVE 460V W/ 3HP MOTOR #ACS310-03U-06A2	X		
2-45-001075	VARIABLE FREQUENCY DRIVE 460V W/ 5HP MOTOR #ACS310-03U-09A7-4		X	
	FUSES			
2-45-000387	7-1/2 AMP TIME DELAY FUSE #ATQR7-1/2	X	X	
2-45-001000	2 AMP FUSE #ATQR2 - (REPLACES FNQ-R-2)	X	X	
2-45-000381	3 AMP FUSE #ATQR3 - (REPLACES FNQ-R-3)	X	X	

VANTAGE LOW EMISSIONS - BEKAERT BURNER				
		MODEL		
PART NUMBER	DESCRIPTION	3000	4000	6000
2-45-000998	4 AMP FUSE #ATQR4 - (REPLACES FNQ-R-4)	X	X	Contact Factory
2-45-000995	5 AMP FUSE #ATQR5 - (REPLACES FNQ-R-5)	X	X	
2-45-000371	FUSE HOLDER #USM1	X	X	
2-45-000368	2 AMP FUSE #ATMR2 - (REPLACES KTKR-2)	X	X	
2-45-000366	4 AMP FUSE #ATMR4 - (REPLACES KTKR-4)	X	X	
2-45-000367	5 AMP FUSE #ATMR5 - (REPLACES KTKR-5)	X	X	
2-45-000365	8 AMP FUSE #ATMR8 - (REPLACES KTKR-8)	X	X	
2-45-000380	10 AMP FUSE #ATMR10 - (REPLACES KTKR-10)	X	X	
2-45-000465	12 AMP FUSE #ATMR12 - (REPLACES KTKR-12)	X	X	
2-45-000214	LPJ 1-6/10 AMP FUSE BUSSMAN LOW PEAK	X	X	
2-45-000151	2 AMP FUSE #AJT2 - (REPLACES LPJ-2)	X	X	
2-45-000360	3 AMP FUSE #AJT3 - (REPLACES LPJ-3)	X	X	
2-45-000361	LPJ 4 AMP FUSE BUSSMAN LOW PEAK	X	X	
2-45-000250	5 AMP FUSE #AJT5 - (REPLACES LPJ-5)	X	X	
2-45-000363	7 AMP FUSE #AJT7 - (REPLACES LPJ-7)	X	X	
2-45-000267	10 AMP FUSE #AJT10 - (REPLACES LPJ10-SP)	X	X	
	TRIM / MISC.			
2-12-000049	1” FLAT ROPE GASKET (PER FT)	X	X	
2-45-000040	1/2” KNOCKOUT PLUGS #2643	X	X	
2-12-000210	1/4” ROPE GASKET (PER FT)	X	X	
2-22-000035	12-14 X 3/4” SELF-TAPPING HEX HEAD SCREWS	X	X	
2-12-000416	4” 150# ELASTAGRAPH RING GASKET 1/8THK SS304	X		
2-12-000420	6” 150# ELASTAGRAPH RING GASKET 1/8THK SS304		X	
2-23-000295	6 OZ. TOUCHUP SPRAY PAINT - SMOKY ASH	X	X	
2-45-000053	7/8” KNOCKOUT PLUGS #2703	X	X	
4-57-000440	CONDENSATE DRAIN KIT ASSEMBLY	X	X	
2-10-000168	FLOAT ASSEMBLY FOR CONDENSATE DRAIN KIT	X	X	
2-12-001027	INSULATION SET VTG-3000	X		
2-12-001019	INSULATION SET VTG-4000		X	
2-60-000003	LOCKTITE THREAD SEALANT 250ML TUBE #565-41-250	X	X	
2-12-000511	PRIMARY PV MILL BOARD GASKET VTG-3000	X		
2-12-000544	PRIMARY PV MILL BOARD GASKET VTG-4000		X	
2-11-CH1001	PRIMARY PV TURBULATOR VTG-3000	X		
2-10-000292	PRIMARY PV TURBULATOR VTG-4000		X	
2-12-000905	SECONDARY HEAT EXCHANGER DOOR GASKET 14”OD X 12”ID	X	X	
2-10-000287	SECONDARY HEAT EXCHANGER TURBULATOR	X	X	
2-20-000023	3” WATER LEVEL PROBE	X	X	
	SAFETY RELIEF VALVE			
2-30-000221	1-1/4” SAFETY VALVE 30 PSI #10-616-05	X		
2-30-000922	1-1/2” SAFETY VALVE 30 PSI #10-617-05		X	
2-30-000266	1-1/4” SAFETY VALVE 60 PSI #10-616-12	X	X	

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Annual Maintenance Kits

VANTAGE LOW EMISSIONS - BEKAERT BURNER

PART NUMBER	DESCRIPTION	MODEL 3000	MODEL 4000	MODEL 6000
2-30-000921	1" SAFETY VALVE 100 PSI #10-615-20	X	X	Contact Factory
2-30-000020	3/4" SAFETY VALVE 125 PSI #10-614-25	X		
2-30-000904	1" SAFETY VALVE 125 PSI #10-615-25		X	
2-30-000166	3/4" SAFETY VALVE 160 PSI #10-614-36	X	X	

ANNUAL MAINTENANCE KITS

4-30-002000	**VTG-2000 MAXON NATURAL GAS**
PART NO	**DESCRIPTION**
2-12-000049	1" FLAT ROPE GASKET (8FT INCLUDED)
2-45-000040	1/2" KNOCKOUT PLUGS #2643 (12 INCLUDED)
2-12-000210	1/4" ROPE GASKET (13FT INCLUDED)
2-22-000035	12-14 X 3/4" SELF-TAPPING HEX HEAD SCREWS (20 INCLUDED)
2-23-000295	6 OZ. TOUCHUP SPRAY PAINT - SMOKY ASH
2-45-000053	7/8" KNOCKOUT PLUGS #2703 (2 INCLUDED)
2-45-000533	BURNER DISCHARGE SLEEVE GASKET 8", #28476
2-12-000262	EB3 REFRACTORY RING VTG-2000, 17-1/2" OD X 12-1/8" ID
2-45-000524	IGNITER, 5.875" W/O 0.375 TIP, #47232
2-60-000003	LOCKTITE THREAD SEALANT 250ML TUBE #565-41-250
2-12-000533	PRIMARY PV MILL BOARD GASKET VTG-2000
2-45-000528	RECTANGULAR BURNER AIR INLET GASKET, #50556
2-45-000530	ROUND BURNER AIR INLET GASKET 4", #06936
2-12-000905	SECONDARY HEAT EXCHANGER DOOR GASKET 14"OD X 12"ID
2-20-000023	3" WATER LEVEL PROBE
4-30-002010	**VTG-2000 RIELLO #2 OIL/GAS**
PART NO	**DESCRIPTION**
2-45-000040	1/2" KNOCKOUT PLUGS #2643 (12 INCLUDED)
2-12-000210	1/4" ROPE GASKET (13FT INCLUDED)
2-22-000035	12-14 X 3/4" SELF-TAPPING HEX HEAD SCREWS (20 INCLUDED)
2-23-000295	6 OZ. TOUCHUP SPRAY PAINT - SMOKY ASH
2-45-000053	7/8" KNOCKOUT PLUGS #2703 (2 INCLUDED)
2-12-001033	BURNER DISCHARGE SLEEVE GASKET 10-1/2" X 10-1/2" (2 INCLUDED)
2-12-000263	BURNER REFRACTORY RING VTG-2000DF 17-1/8" OD X 10-1/4" ID
2-30-001621	GAS IGNITION ELECTRODE #3013052
2-60-000003	LOCKTITE THREAD SEALANT 250ML TUBE #565-41-250
2-30-001628	OIL IGNITION ELECTRODES #3013040 & 3013041 (SET OF 2)
2-30-000803	OIL NOZZLE, 5GPH 45 DEG. #C5222470
2-30-000807	OIL NOZZLE, 5GPH 60 DEG. #C5222450
2-12-000533	PRIMARY PV MILL BOARD GASKET VTG-2000
2-12-000905	SECONDARY HEAT EXCHANGER DOOR GASKET 14"OD X 12"ID

ANNUAL MAINTENANCE KITS	
2-20-000023	3” WATER LEVEL PROBE
4-30-003000	**VTG-3000 MAXON NATURAL GAS**
PART NO	**DESCRIPTION**
2-12-000049	1” FLAT ROPE GASKET (11FT INCLUDED)
2-45-000040	1/2” KNOCKOUT PLUGS #2643 (12 INCLUDED)
2-12-000210	1/4” ROPE GASKET (15FT INCLUDED)
2-22-000035	12-14 X 3/4” SELF-TAPPING HEX HEAD SCREWS (20 INCLUDED)
2-23-000295	6 OZ. TOUCHUP SPRAY PAINT - SMOKY ASH
2-45-000053	7/8” KNOCKOUT PLUGS #2703 (2 INCLUDED)
2-45-000532	BURNER DISCHARGE SLEEVE GASKET 10”, #28477
2-12-000261	EB4 REFRACTORY RING VTG-3000, 18-3/4” OD X 14-5/16” ID
2-45-000524	IGNITER, 5.875” W/O 0.375 TIP, #47232
2-60-000003	LOCKTITE THREAD SEALANT 250ML TUBE #565-41-250
2-12-000511	PRIMARY PV MILL BOARD GASKET VTG-3000
2-45-000527	RECTANGULAR BURNER AIR INLET GASKET, #50562
2-45-000529	ROUND BURNER AIR INLET GASKET 6”, #07015
2-12-000905	SECONDARY HEAT EXCHANGER DOOR GASKET 14”OD X 12”ID
2-20-000023	3” WATER LEVEL PROBE
4-30-003010	**VTG-3000 RIELLO #2 OIL/GAS**
PART NO	**DESCRIPTION**
2-45-000040	1/2” KNOCKOUT PLUGS #2643 (12 INCLUDED)
2-12-000210	1/4” ROPE GASKET (15FT INCLUDED)
2-22-000035	12-14 X 3/4” SELF-TAPPING HEX HEAD SCREWS (20 INCLUDED)
2-23-000295	6 OZ. TOUCHUP SPRAY PAINT - SMOKY ASH
2-45-000053	7/8” KNOCKOUT PLUGS #2703 (2 INCLUDED)
2-12-001033	BURNER DISCHARGE SLEEVE GASKET 10-1/2” X 10-1/2” (2 INCLUDED)
2-12-000259	BURNER REFRACTORY RING VTG-3000DF 18-3/4” OD X 10-1/4” ID
2-30-001621	GAS IGNITION ELECTRODE #3013052
2-60-000003	LOCKTITE THREAD SEALANT 250ML TUBE #565-41-250
2-30-001628	OIL IGNITION ELECTRODES #3013040 & 3013041 (SET OF 2)
2-12-000511	PRIMARY PV MILL BOARD GASKET VTG-3000
2-12-000905	SECONDARY HEAT EXCHANGER DOOR GASKET 14”OD X 12”ID
2-30-001635	OIL NOZZLE, 7.5GPH 45 DEG. #C5222438 (2 INCLUDED)
2-20-000023	3” WATER LEVEL PROBE
4-30-003002	**VTG-3000 BEKAERT NATURAL GAS**
PART NO	**DESCRIPTION**
2-12-000049	1” FLAT ROPE GASKET (11FT INCLUDED)

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ANNUAL MAINTENANCE KITS	
2-45-000040	1/2” KNOCKOUT PLUGS #2643 (12 INCLUDED)
2-12-000210	1/4” ROPE GASKET (15FT INCLUDED)
2-22-000035	12-14 X 3/4” SELF-TAPPING HEX HEAD SCREWS (20 INCLUDED)
2-23-000295	6 OZ. TOUCHUP SPRAY PAINT - SMOKY ASH
2-45-000053	7/8” KNOCKOUT PLUGS #2703 (2 INCLUDED)
2-12-003030	BURNER GASKET SET
2-12-000258	BURNER REFRACTORY VTG-3000LE 18-3/4” OD X 10”ID
2-60-000003	LOCKTITE THREAD SEALANT 250ML TUBE #565-41-250
2-12-000511	PRIMARY PV MILL BOARD GASKET VTG-3000
2-12-003035	RECTANGULAR BLOWER GASKET VTG-3000LE
2-12-000905	SECONDARY HEAT EXCHANGER DOOR GASKET 14”OD X 12”ID
2-20-000023	3” WATER LEVEL PROBE
4-30-004000	**VTG-4000 MAXON NATURAL GAS**
PART NO	**DESCRIPTION**
2-12-000049	1” FLAT ROPE GASKET (16FT INCLUDED)
2-45-000040	1/2” KNOCKOUT PLUGS #2643 (12 INCLUDED)
2-12-000210	1/4” ROPE GASKET (18FT INCLUDED)
2-22-000035	12-14 X 3/4” SELF-TAPPING HEX HEAD SCREWS (20 INCLUDED)
2-23-000295	6 OZ. TOUCHUP SPRAY PAINT - SMOKY ASH
2-45-000053	7/8” KNOCKOUT PLUGS #2703 (2 INCLUDED)
2-45-000532	BURNER DISCHARGE SLEEVE GASKET 10”, #28477
2-12-000266	EB5 REFRACTORY RING VTG-4000, 22-7/8” OD X 14-3/16” ID
2-45-000524	IGNITER, 5.875” W/O 0.375 TIP, #47232
2-60-000003	LOCKTITE THREAD SEALANT 250ML TUBE #565-41-250
2-12-000544	PRIMARY PV MILL BOARD GASKET VTG-4000
2-12-003048	RECTANGULAR BURNER AIR INLET GASKET
2-12-003049	RECTANGULAR BLOWER GASKET FOR FAN HOUSING
2-12-000905	SECONDARY HEAT EXCHANGER DOOR GASKET 14”OD X 12”ID
2-20-000023	3” WATER LEVEL PROBE
4-30-004010	**VTG-4000 RIELLO #2 OIL/GAS**
PART NO	**DESCRIPTION**
2-60-000003	LOCKTITE THREAD SEALANT 250ML TUBE #565-41-250
2-45-000040	1/2” KNOCKOUT PLUGS #2643 (12 INCLUDED)
2-12-000210	1/4” ROPE GASKET (18FT INCLUDED)
2-22-000035	12-14 X 3/4” SELF-TAPPING HEX HEAD SCREWS (20 INCLUDED)
2-23-000295	6 OZ. TOUCHUP SPRAY PAINT - SMOKY ASH
2-45-000053	7/8” KNOCKOUT PLUGS #2703 (2 INCLUDED)
2-12-001033	BURNER DISCHARGE SLEEVE GASKET 10-1/2” X 10-1/2” (2 INCLUDED)
2-12-000265	BURNER REFRACTORY RING VTG-4000DF 22-7/8” OD X 10-1/4” ID
2-30-001621	GAS IGNITION ELECTRODE #3013052
2-30-001628	OIL IGNITION ELECTRODES #3013040 & 3013041 (SET OF 2)

ANNUAL MAINTENANCE KITS	
2-12-000544	PRIMARY PV MILL BOARD GASKET VTG-4000
2-12-000905	SECONDARY HEAT EXCHANGER DOOR GASKET 14”OD X 12”ID
2-30-001636	OIL NOZZLE, 11GPH 60 DEG. #C5222446 (2 INCLUDED)
2-20-000023	3” WATER LEVEL PROBE
4-30-004002	**VTG-4000 BEKAERT NATURAL GAS**
PART NO	**DESCRIPTION**
2-12-000049	1” FLAT ROPE GASKET (16FT INCLUDED)
2-45-000040	1/2” KNOCKOUT PLUGS #2643 (12 INCLUDED)
2-12-000210	1/4” ROPE GASKET (18FT INCLUDED)
2-22-000035	12-14 X 3/4” SELF-TAPPING HEX HEAD SCREWS (20 INCLUDED)
2-23-000295	6 OZ. TOUCHUP SPRAY PAINT - SMOKY ASH
2-45-000053	7/8” KNOCKOUT PLUGS #2703 (2 INCLUDED)
2-12-003030	BURNER GASKET SET
2-12-000267	BURNER REFRACTORY VTG-4000LE 22-5/8” OD X 10”ID
2-60-000003	LOCKTITE THREAD SEALANT 250ML TUBE #565-41-250
2-12-000544	PRIMARY PV MILL BOARD GASKET VTG-4000
2-12-003045	RECTANGULAR BLOWER GASKET VTG-4000LE
2-12-000905	SECONDARY HEAT EXCHANGER DOOR GASKET 14”OD X 12”ID
2-20-000023	3” WATER LEVEL PROBE

Spare Parts Kits

SPARE PARTS KITS	
4-30-002020	**VTG-2000 MAXON NATURAL GAS**
PART NO	**DESCRIPTION**
2-45-000309	BLACK 2 POSITION SWITCH #3SB3202-2KA11
2-40-000648	3RB2016-2PB0 OVERLOAD 1.5-6 AMP W/MR
2-40-000878	3RT1015-1AK6 MOTOR CONTACTOR 7 AMP 120V
2-40-000801	4 X 12 TYPE J THERMOCOUPLE #92-006-04-20
2-40-000131	GENERAL PURPOSE (ICE CUBE) RELAY 120V-AB #700HA32A1 - (3 INCLUDED)
2-40-000096	BASE FOR ICE CUBE RELAY #700HN125 - (3 INCLUDED)
2-10-000168	FLOAT ASSEMBLY FOR CONDENSATE DRAIN KIT
4-40-003020	IGNITION WIRE SET ASSEMBLY VTG-2000
2-40-000421	LOW WATER CUT OFF RELAY #26MB1M0-FF
2-45-000305	RED PUSH BUTTON LIGHT #3SB3001-0BA21 - (2 INCLUDED)
2-40-000472	SERVO MOTOR (FOR LMV 37) #SQM33.550A9
2-40-001083	SQM 33 GAS SERVO COUPLING #CCM10DCA-M10RXA
2-40-001084	SQM 33 AIR SERVO COUPLING W/ SET SCREW

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SPARE PARTS KITS	
2-40-000475	UV SCANNER (FOR LMV 37) #QRA4.U
4-30-002030	**VTG-2000 RIELLO #2 OIL/GAS**
PART NO	**DESCRIPTION**
2-30-000343	0-400 PSI GAUGE (LIQUID FILLED) #Q817
2-45-000309	BLACK 2 POSITION SWITCH #3SB3202-2KA11 - (2 INCLUDED)
2-40-000648	3RB2016-2PB0 OVERLOAD 1.5-6 AMP W/MR
2-40-000878	3RT1015-1AK6 MOTOR CONTACTOR 7 AMP 120V
2-40-000430	CABLE FOR AZL DISPLAY #AGG5.635
2-40-000131	GENERAL PURPOSE (ICE CUBE) RELAY 120V-AB #700HA32A1 - (2 INCLUDED)
2-40-000096	BASE FOR ICE CUBE RELAY #700HN125 - (2 INCLUDED)
2-40-000833	BURNER/BLOWER CONTACTOR 208-230/460V VTG-2000DF #3012936
2-40-000447	CAN BUS WIRE #AGG5.643 (12FT INCLUDED)
2-10-000168	FLOAT ASSEMBLY FOR CONDENSATE DRAIN KIT
2-40-000421	LOW WATER CUT OFF RELAY #26MB1M0-FF
2-30-001623	OIL DRIVE COUPLING #3013051
2-30-001627	OIL HT LEAD #3012959 (2 INCLUDED)
2-30-001633	OIL PUMP #3013523
2-30-001629	OIL VALVE #3012952
2-30-001620	PILOT HT LEAD #3013140
2-45-000305	RED PUSH BUTTON LIGHT #3SB3001-0BA21 - (2 INCLUDED)
2-40-000819	RTD 3/16” OD WITH 4” INSERTION
2-30-000298	1/2” PILOT SOLENOID VALVE 120/60 #8214G020
2-40-000434	SQM45 SERVO MOTOR (LMV 51/52) #SQM45.295A9
4-30-003020	**VTG-3000 MAXON NATURAL GAS**
PART NO	**DESCRIPTION**
2-45-000309	BLACK 2 POSITION SWITCH #3SB3202-2KA11
2-40-000573	3RB2016-2SB0 OVERLOAD 3-12 AMP W/MR
2-40-000567	3RT1016-1AK6 MOTOR CONTACTOR 9 AMP 120V
2-40-000801	4 X 12 TYPE J THERMOCOUPLE #92-006-04-20
2-40-000096	BASE FOR ICE CUBE RELAY #700HN125 - (3 INCLUDED)
2-10-000168	FLOAT ASSEMBLY FOR CONDENSATE DRAIN KIT
2-40-000131	GENERAL PURPOSE (ICE CUBE) RELAY 120V-AB #700HA32A1 - (3 INCLUDED)
4-40-003030	IGNITION WIRE SET ASSEMBLY VTG-3000
2-40-000421	LOW WATER CUT OFF RELAY #26MB1M0-FF
2-45-000305	RED PUSH BUTTON LIGHT #3SB3001-0BA21 - (2 INCLUDED)
2-40-000472	SERVO MOTOR (FOR LMV 37) #SQM33.550A9
2-40-001083	SQM 33 GAS SERVO COUPLING #CCM10DCA-M10RXA
2-40-001084	SQM 33 AIR SERVO COUPLING W/ SET SCREW
2-40-000475	UV SCANNER (FOR LMV 37) #QRA4.U
4-30-003030	**VTG-3000 RIELLO #2 OIL/GAS**
PART NO	**DESCRIPTION**
2-30-000343	0-400 PSI GAUGE (LIQUID FILLED) #Q817
2-45-000309	BLACK 2 POSITION SWITCH #3SB3202-2KA11 - (2 INCLUDED)
2-40-000648	3RB2016-2PB0 OVERLOAD 1.5-6 AMP W/MR

SPARE PARTS KITS	
2-40-000878	3RT1015-1AK6 MOTOR CONTACTOR 7 AMP 120V
2-40-000430	CABLE FOR AZL DISPLAY #AGG5.635
2-40-000096	BASE FOR ICE CUBE RELAY #700HN125 - (2 INCLUDED)
2-30-001624	BURNER/BLOWER CONTACTOR 208-230/460V VTG-4000DF #3012937
2-40-000447	CAN BUS WIRE #AGG5.643 (12FT INCLUDED)
2-10-000168	FLOAT ASSEMBLY FOR CONDENSATE DRAIN KIT
2-40-000131	GENERAL PURPOSE (ICE CUBE) RELAY 120V-AB #700HA32A1 - (2 INCLUDED)
2-40-000421	LOW WATER CUT OFF RELAY #26MB1M0-FF
2-30-001623	OIL DRIVE COUPLING #3013051
2-30-001627	OIL HT LEAD #3012959 (2 INCLUDED)
2-30-001633	OIL PUMP #3013523
2-30-001629	OIL VALVE #3012952
2-30-001620	PILOT HT LEAD #3013140
2-45-000305	RED PUSH BUTTON LIGHT #3SB3001-0BA21 - (2 INCLUDED)
2-40-000819	RTD 3/16” OD WITH 4” INSERTION
2-30-000298	1/2” PILOT SOLENOID VALVE 120/60 #8214G020
2-40-000434	SQM45 SERVO MOTOR (LMV 51/52) #SQM45.295A9
4-30-003022	**VTG-3000 BEKAERT NATURAL GAS**
PART NO.	**DESCRIPTION**
2-45-000309	BLACK 2 POSITION SWITCH #3SB3202-2KA11
2-45-001074	VARIABLE FREQUENCY DRIVE 460V W/ 3HP MOTOR #ACS310-03U-06A2
2-30-000739	AIR INLET FILTER 10” X 10” X 1” #CS10X10X1
2-40-000096	BASE FOR ICE CUBE RELAY #700HN125 - (3 INCLUDED)
2-40-000464	FLAME DETECTOR THERMAL BARRIER
2-10-000168	FLOAT ASSEMBLY FOR CONDENSATE DRAIN KIT
7-20-003015	PILOT TUBE ASSEMBLY
2-40-000131	GENERAL PURPOSE (ICE CUBE) RELAY 120V-AB #700HA32A1 - (3 INCLUDED)
4-40-003030	IGNITION WIRE SET ASSEMBLY VTG-3000
2-40-000421	LOW WATER CUT OFF RELAY #26MB1M0-FF
2-45-000305	RED PUSH BUTTON LIGHT #3SB3001-0BA21 - (2 INCLUDED)
2-40-000819	RTD 3/16” OD WITH 4” INSERTION
2-40-000472	SERVO MOTOR (FOR LMV 37) #SQM33.550A9
2-40-001083	SQM 33 GAS SERVO COUPLING #CCM10DCA-M10RXA
2-40-001084	SQM 33 AIR SERVO COUPLING W/ SET SCREW
2-40-000475	UV SCANNER (FOR LMV 37) #QRA4.U
4-30-004020	**VTG-4000 MAXON NATURAL GAS**
PART NO	**DESCRIPTION**
2-45-000309	BLACK 2 POSITION SWITCH #3SB3202-2KA11
2-40-000573	3RB2016-2SB0 OVERLOAD 3-12 AMP W/MR
2-40-000567	3RT1016-1AK6 MOTOR CONTACTOR 9 AMP 120V
2-40-000801	4 X 12 TYPE J THERMOCOUPLE #92-006-04-20
2-40-000096	BASE FOR ICE CUBE RELAY #700HN125 - (3 INCLUDED)
2-10-000168	FLOAT ASSEMBLY FOR CONDENSATE DRAIN KIT

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SPARE PARTS KITS	
2-40-000131	GENERAL PURPOSE (ICE CUBE) RELAY 120V-AB #700HA32A1 - (3 INCLUDED)
4-40-003040	IGNITION WIRE SET ASSEMBLY VTG-4000
2-40-000421	LOW WATER CUT OFF RELAY #26MB1M0-FF
2-45-000305	RED PUSH BUTTON LIGHT #3SB3001-0BA21 - (2 INCLUDED)
2-40-000472	SERVO MOTOR (FOR LMV 37) #SQM33.550A9
2-40-001083	SQM 33 GAS SERVO COUPLING #CCM10DCA-M10RXA
2-40-001084	SQM 33 AIR SERVO COUPLING W/ SET SCREW
2-40-000475	UV SCANNER (FOR LMV 37) #QRA4.U
4-30-004030	**VTG-4000 RIELLO #2 OIL/GAS**
PART NO	**DESCRIPTION**
2-30-000343	0-400 PSI GAUGE (LIQUID FILLED) #Q817
2-45-000309	BLACK 2 POSITION SWITCH #3SB3202-2KA11 - (2 INCLUDED)
2-40-000648	3RB2016-2PB0 OVERLOAD 1.5-6 AMP W/MR
2-40-000878	3RT1015-1AK6 MOTOR CONTACTOR 7 AMP 120V
2-40-000430	CABLE FOR AZL DISPLAY #AGG5.635
2-40-000096	BASE FOR ICE CUBE RELAY #700HN125 - (2 INCLUDED)
2-30-001624	BURNER/BLOWER CONTACTOR 208-230/460V VTG-4000DF #3012937
2-40-000447	CAN BUS WIRE #AGG5.643 (12FT INCLUDED)
2-10-000168	FLOAT ASSEMBLY FOR CONDENSATE DRAIN KIT
2-40-000131	GENERAL PURPOSE (ICE CUBE) RELAY 120V-AB #700HA32A1 - (2 INCLUDED)
2-40-000421	LOW WATER CUT OFF RELAY #26MB1M0-FF
2-30-001623	OIL DRIVE COUPLING #3013051
2-30-001627	OIL HT LEAD #3012959 (2 INCLUDED)
2-30-001633	OIL PUMP #3013523
2-30-001629	OIL VALVE #3012952
2-30-001620	PILOT HT LEAD #3013140
2-45-000305	RED PUSH BUTTON LIGHT #3SB3001-0BA21 - (2 INCLUDED)
2-40-000819	RTD 3/16” OD WITH 4” INSERTION
2-30-000298	1/2” PILOT SOLENOID VALVE 120/60 #8214G020
2-40-000434	SQM45 SERVO MOTOR (LMV 51/52) #SQM45.295A9
4-30-004022	**VTG-4000 BEKAERT NATURAL GAS**
PART NO.	**DESCRIPTION**
2-45-000309	BLACK 2 POSITION SWITCH #3SB3202-2KA11
2-45-001075	VARIABLE FREQUENCY DRIVE 460V W/ 5HP MOTOR #ACS310-03U-09A7-4
2-30-000739	AIR INLET FILTER 10” X 10” X 1” #CS10X10X1
2-40-000096	BASE FOR ICE CUBE RELAY #700HN125 - (3 INCLUDED)
2-40-000464	FLAME DETECTOR THERMAL BARRIER
2-10-000168	FLOAT ASSEMBLY FOR CONDENSATE DRAIN KIT
7-20-003015	PILOT TUBE ASSEMBLY
2-40-000131	GENERAL PURPOSE (ICE CUBE) RELAY 120V-AB #700HA32A1 - (3 INCLUDED)
4-40-003040	IGNITION WIRE SET ASSEMBLY VTG-4000
2-40-000421	LOW WATER CUT OFF RELAY #26MB1M0-FF
2-45-000305	RED PUSH BUTTON LIGHT #3SB3001-0BA21 - (2 INCLUDED)

SPARE PARTS KITS	
2-40-000819	RTD 3/16" OD WITH 4" INSERTION
2-40-000472	SERVO MOTOR (FOR LMV 37) #SQM33.550A9
2-40-001083	SQM 33 GAS SERVO COUPLING #CCM10DCA-M10RXA
2-40-001084	SQM 33 AIR SERVO COUPLING W/ SET SCREW
2-40-000475	UV SCANNER (FOR LMV 37) #QRA4.U

PAST DESIGNS

PART NO	DESCRIPTION	VTG-2000	VTG-3000	VTG-4000	VTG-2000DF	VTG-3000DF	VTG-4000DF
	BURNER/BLOWER						
2-30-003060	CINCINNATI FAN, HOUSING & 3 HP MOTOR SPB-12				X		
2-40-000599	FAN MOTOR 3 HP 208-230/460/60/3 TEFC C-FACE				X	X	
2-40-000433	SQM48 AIR SERVO MOTOR (LMV 51/52) SQM48.497A9	X	X	X	X	X	
2-35-001017	SQM48 SERVO COUPLING (LMV 51) 3/8" X 14MM W/5MM KEYWAY				X	X	
5-10-003070	8" AIR BUTTERFLY VALVE, FLANGED, ALUMINUM				X	X	
2-30-000244	FAN GUARD SCREEN				X	X	
2-30-000486	AIR SWITCH 3-11"WC #1910-10				X	X	
2-30-001608	VTG-2000 DF MAXON BURNER, #EB3MRVC 50P				X		
2-30-001604	VTG-3000 DF MAXON BURNER, #EB4MRVC 50P					X	
2-12-000262	EB3 REFRACTORY RING VTG-2000, 17-1/2" OD X 12-1/8" ID				X		
2-12-000261	EB4 REFRACTORY RING VTG-3000, 18-3/4" OD X 14-5/16" ID					X	
2-45-000533	8" BURNER DISCHARGE SLEEVE GASKET #28476				X		

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PART NO	DESCRIPTION	VTG-2000	VTG-3000	VTG-4000	VTG-2000DF	VTG-3000DF	VTG-4000DF
2-45-000532	10" BURNER DISCHARGE SLEEVE GASKET #28477					X	
2-45-000530	4" ROUND BURNER AIR INLET GASKET #06936				X		
2-45-000529	6" ROUND BURNER AIR INLET GASKET #07015					X	
2-45-000526	RECTANGULAR BURNER AIR INLET GASKET (EB3 MAXON) #50561				X		
2-45-000525	RECTANGULAR BURNER AIR INLET GASKET (EB4 MAXON) #50559					X	
2-40-000465	FLAME DETECTOR (LMV 51) #QRI2A2.B180B	X	X	X	X	X	X
2-45-000523	IGNITER FOR MAXON OVENPAK 500 #47633				X	X	
2-35-001014	SQM33/45 AIR SERVO COUPLING (LMV 37) 10MM X 10MM	X	X	X			
	GAS TRAIN						
2-40-000388	HIGH GAS PRESSURE SWITCH W/MR 10-60"WC - #QPH31.150M00				X	X	
2-30-000398	1/4" 200# BALL VALVE MXF #70-801-A6				X	X	
2-30-000281	1-1/2" BALL VALVE, #80-107-01				X	X	
2-30-000516	1-1/2" REGULATOR (1 PSI MAX) RV81				X		
2-30-000517	2" REGULATOR (1 PSI MAX) RV91					X	
2-30-000003	1-1/2" SINGLE SHUTOFF VALVE, #VGG10.404U				X	X	
2-40-000381	SHUTOFF VALVE ACTUATOR #SKP15.011U1				X	X	
5-10-003033	3/4" THRU 1-1/2" GAS BUTTERFLY VALVE SERVO BRACKET				X	X	
2-35-001014	SQM33/45 GAS SERVO COUPLING (LMV 37) 10MM X 10MM				X	X	
2-40-000434	SQM45 GAS SERVO MOTOR (LMV 51/52) #SQM45.295A9				X	X	
	MAXON PILOT LINE						
2-30-000111	1/2" UL BALL VALVE #80-103-01				X	X	
2-30-000677	1/2" 325-3 PILOT GAS REGULATOR #325-3-44-0002				X	X	
2-30-000298	1/2" PILOT SOLENOID VALVE 120/60 #8214G020				X	X	
2-30-000566	1/4" X 1/4" X 24"L FLEX CONNECTOR				X	X	
	OIL TRAIN						
2-30-005000	OIL PUMP #2R213C-5BQ14				X	X	
2-40-001600	OIL PUMP MOTOR 3/4HP TEFC C-FACE #C6T17FK5E				X	X	
2-30-000780	LOVEJOY COUPLING #68514444829				X	X	
2-30-000283	OIL SOLENOID VALVE 120/60 #8262G023V				X	X	
2-40-003043	PRESSURE SWITCH 15-150PSI AUTO RESET KP-36 #060-213166				X	X	

PART NO	DESCRIPTION	VTG-2000	VTG-3000	VTG-4000	VTG-2000DF	VTG-3000DF	VTG-4000DF
2-40-001037	OIL MODULATION VALVE S-3-7 HAUCK #42573				X		
2-40-000358	OIL MODULATION VALVE S-3-9D HAUCK #42574					X	
5-10-003043	OIL MODULATION VALVE & SERVO BRACKET				X	X	
2-35-001007	OIL MODULATION VALVE &SERVO COUPLING 3/4" X 14MM				X	X	
2-40-000434	SQM45 OIL SERVO MOTOR (LMV 51/52) #SQM45.295A9				X	X	
2-30-000019	1/4" NPT BALL VALVE B62 250SWP #70B-141-A0				X	X	
2-30-000342	0-200PSI LIQUID FILLED GAUGE #Q806				X	X	
	AIR TRAIN						
2-30-000287	SOLENOID VALVE 180PSI MAX 120/60 #8262G202				X	X	
2-30-001187	AIR FILTER / REGULATOR 1/4" 250PSI #5001K66				X	X	
2-30-001185	AIR FILTER #4958K82				X	X	
2-40-003043	PRESSURE SWITCH 15-150PSI AUTO RESET KP-36 #060-213166				X	X	
	GENERAL ELECTRICAL COMPONENTS						
2-40-000084	IGNITION TRANSFORMER 120/50 #E06-SC2	X	X	X	X	X	X
2-40-000135	GENERAL PURPOSE RELAY 220V #700HA32A2	X	X	X	X	X	X
2-40-000566	OVERLOAD .32 - 1.25AMP #3RB2016-2NB0	X	X	X	X	X	X
2-40-000657	VIBRATONE ALARM HORN #350-120-30	X	X	X	X	X	X
2-40-000449	LMV51 TEMPERATURE CONTROL 120V #LMV51.140C1	X	X	X			
2-40-000437	AZL DISPLAY MODULE #AZL52.40B1	X	X	X			
2-40-000447	CAN BUS WIRE (PER FT) #AGG5.643	X	X	X			
2-40-000431	LMV POWER SUPPLY #AGG5.210	X	X	X			
2-40-000430	CABLE FOR AZL DISPLAY #AGG5.635	X	X	X			
2-40-000429	LMV CONNECTOR PLUG SET #AGG5.720	X	X	X			
	TRIM / MISC.						
2-23-000172	6 OZ. TOUCHUP TECH TAN SPRAY PAINT CANS	X	X	X	X	X	X
2-12-000051	3/8" ROPE GASKET (PER FT)	X	X	X	X	X	X
2-12-000003	5/8" ROPE GASKET (PER FT)	X	X	X	X	X	X

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